Salmon Habitat Protection and Restoration Plan for Water Resource Inventory Area 14, Kennedy-Goldsborough

Mason Conservation District Lead Entity

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Executive Summary

The Salmon Habitat Protection and Restoration Plan for WRIA 14 is a comprehensive multi-species approach for developing habitat project lists that lead to restoring and protecting salmon habitat through voluntary projects.

The plan follows a stepwise approach to implements Chapter 77.85 RCW and subsequent guidance from the Salmon Recovery Funding Board. The approach entails:

- Relying on the best available science to understand the needs of salmon habitat protection and restoration in WRIA 14
- Developing prioritized projects and programs that follow a logical, sequential approach for sustaining healthy populations of salmon
- Using a user-friendly project development process that encourages local sponsors to undertake prioritized projects and programs
- Building community support for salmon habitat project lists

This approach leads to seven chapters for the plan:

1. The WRIA 14 Vision for Salmon Habitat Protection and Restoration, which speaks to the long-term vision of preserving or enhancing biologically diverse runs of salmon capable of self-sustaining natural reproduction through habitat protection and restoration.

2. WRIA 14 Salmonid Profile and Strategies contains: 1) a broad overview of the salmon species present in WRIA 14 and their status, and 2) a habitat protection and restoration approach that
   - In the upper stream reaches will primarily benefit migration, spawning and rearing habitat for coho, cutthroat, and steelhead
   - In the lower reaches will benefit migration habitat for all species, spawning habitat for chum, and rearing habitat for coho, cutthroat, and steelhead
   - In the nearshore will benefit the migration, feeding, and rearing of salmonids and he spawning and rearing of forage fish.

3. Annual High Priority Approach a prioritization of projects and programs that emphasizes the highest needs for salmon habitat protection and restoration from a WRIA-wide perspective. In 2004, the focus is on ensuring that the Habitat Project List submitted to the Salmon Recovery Funding Board is consistent with this plan.

4. Subbasin/Nearshore Assessment & High Priority Projects & Programs contain data and analysis of the limiting factors and intact habitats for each freshwater subbasin and its associated Puget Sound marine waters. It also includes an intra-subbasin prioritized habitat work schedule for protection and/or restoration actions.

5. Community Issues & Concerns discusses and outlines a WRIA-wide approach for integrating community attitudes and values in line with the Vision Salmon Habitat Protection and Recovery. Focus areas include:
   - Providing more effective educational needs
   - Promoting stewardship and strong partnerships
   - Addressing perceived threat to private property rights
   - Spending money wisely
   - Communicating effectiveness
   - Pointing out the public cost from private benefit
   - Sharing the cost
   - Overcoming a cumbersome bureaucracy

6. Guiding Principles for Program Development, Evaluation, and Ranking Criteria serves two purposes. First, it communicates to project sponsors the elements of good project design consistent with this plan. Second, it gives the WRIA 14 Lead Entity a tool for evaluating and selecting habitat project lists destined to the Salmon Recovery Funding Board or to other potential funding resources. The principles ensure that projects and programs:
   - Must be scientifically sound
   - Addresses habitat needs in sequential order
   - Achieves optimum cost benefit
   - Protects or restores natural stream functions
   - Considers all stocks and life stages
   - Increases the potential for natural productivity
   - Has the potential for long-term success
   - Addresses priority data gaps
   - Capitalizes on site-specific opportunities

7. The Salmon Recovery Funding Board Evaluation and Ranking Process covers the procedures as to how the Lead Entity will work with project sponsors to develop a WRIA 14 Habitat Project List for submittal to the Salmon Recovery Funding Board during the 2004 funding round.

- Chapter One -

The Vision for Salmon Habitat Restoration and Protection in WRIA 14

We envision natural watershed processes in the freshwater and marine environments of WRIA 14 that preserve or enhance biologically diverse runs of salmon capable of self-sustaining natural reproduction. We will achieve this by implementing strategic actions to maximize the productive capacity of the habitat.

We envision a community that supports these efforts through land-use and development choices that emphasize naturally functioning aquatic systems. We will do this by providing outreach and education information to the public in many different forms to reach and involve the broadest possible segments of the population.

The outcomes we intend to achieve through our efforts are

- A process to rank and coordinate projects
- Integration of this salmon habitat restoration and protection plan into larger watershed plans and the larger South Puget Sound Salmon Recovery
- Increased public awareness of salmon habitat needs
- Predictability of success when applying for funding
- Linkage of co-managers
- Renewed funding
- Building a positive reputation and strong relationships
- The full participation of citizens in restoring and protecting salmon habitat
- Maintaining and building momentum for salmon recovery
- Seeing salmon in places that have not been seen in a long time

- Chapter Two -

Overview of Salmonids in WRIA 14

Salmonid Profiles

Salmonids spawning within the freshwater sub-basins of WRIA 14 include chum, coho, winter steelhead trout, and coastal cutthroat trout. Fall Chinook, pink, sockeye, and bull trout rely on the WRIA 14 nearshore for rearing, feeding, and migration.

Chum *(Onchorhynchus keta)*

Chum Life History

South Puget Sound chum typically spawn over a four to five month period from September to March. Chum enter rivers at the slightest increase in stream flow, but late in the spawning season high flows are not essential. Chum are strong swimmers, but not leapers, often reluctant to enter long span fish ladders, and are typically found below the first significant barrier on a stream. They prefer to spawn immediately above turbulent areas or in areas of groundwater upwelling. Eggs are generally buried 20 to 50 cm (~ 8 to 20 inches) deep in the substrate. Premature emergence occurs when eggs are buried less than 20 cm deep. Chum have adapted to spawn in lesser water depths and velocities than pink salmon and some of the other members of the genius Oncorhynchus. Late chum stocks often select spawning sites near springs above 4ºC (~ 39ºF), protecting the eggs from freezing and resulting in relatively consistent emergence timing from year to year. Intertidal spawning provides a similar benefit because the redd is warmed by marine waters during each tidal cycle. After hatching the chum alevins move downward in the gravel. The fish have an elongated body that allows them to move through the substrate better than coho, chinook, and steelhead alevins. They remain in the gravel from 6 to 25 days (Salo 1998).

Fry emerge from the gravel after about 5 months (generally from March through May), typically at night and immediately head downstream to the estuary, feeding along the way. They linger in the estuary while making the transition from fresh to salt water. The fry do not school strongly and are typically found in a scattered distribution. They typically feed on chironomids, mayfly larvae, caddisfly larvae, and other benthic invertebrates (Salo 1998).

Chum are second only to chinook in their dependence upon estuaries. The timing of entry to seawater is often correlated with warming of nearshore waters and the associated plankton blooms. The juveniles feed primarily on zooplankton including copepods and amphipods. The fry feed extensively over submerged tide flats. This

allows them to exploit both freshwater and marine food webs. Juveniles move offshore when they reach 45 to 55 mm (~ 1.8 to 2.2 inches) fork length, enabling them to feed on larger prey and avoid predators. Their prey consists of a variety of zooplankton, krill, and fish larvae. Chum mature in the Gulf of Alaska and Bering Sea before returning to spawn as three to five-year-olds. Three and four-year-olds make up the bulk of runs in South Puget Sound streams (Salo 1998).

Totten Inlet Fall Chum Profile

SaSI rating is "healthy" in 2002. Escapements have been strong since the mid-1980s with very large escapements in 1994 and 1998, 85,272 and 73,427 spawners respectively. This stock is robustly healthy. Data are estimates of total escapement of fall chum to Totten Inlet streams based on index counts of live spawners made annually in Kennedy and Schneider Creeks.

Stock Definition

Totten Inlet fall chum were identified as a stock based on their distinct spawning distribution, genetic differences and run timing.

Spawning Distribution

Most spawning takes place in Kennedy and Schneider Creeks.

Spawning Timing

Spawning generally occurs in late October through mid-December.

Genetic Analysis

Allozyme analysis has shown Totten Inlet Fall chum salmon to be genetically distinct from all other Washington chum stocks examined (Phelps et al. 1995). A unique genetic mark was applied to Kennedy Creek chum during the 1975-1980 return years.

Stock Origin

This is a native stock with wild production.

Skookum Inlet Fall Chum Profile

SaSI rating is "healthy" in 2002. The escapements of Skookum Inlet fall chum salmon stock have been generally strong since the mid-1980s.

Stock Definition

Skookum Inlet fall chum were identified as a stock based on their distinct spawning distribution.

Spawning Distribution

Most spawning takes place in Skookum Creek and its tributary, Little Creek.

Spawning Timing

Spawning generally occurs from late November through early January.

Genetic Analysis

Allozyme analysis has shown Skookum Inlet Fall chum salmon to be closely related to the Elson Creek Hatchery chum stock, which was derived from local wild populations (Phelps et al. 1995).

Stock Origin

This is probably a mixed stock with wild production. Elson Creek Hatchery chum releases occurred in this area. Hatchery plants and straying from the Elson Creek facility may have affected the native component of Skookum fall chum creating a mixed stock or may have replaced the native component with an introduced hatchery stock. The Elson Creek Hatchery no longer produces chum salmon.

Upper Skookum Creek Fall Chum Profile

SaSI rating is "healthy" in 2002. The escapements of Upper Skookum Creek fall chum salmon stock increased in the mid-1980s, from previous escapements generally in the hundreds, then took a substantial leap during the period of 1994 to 2001.

Stock Definition

Upper Skookum Creek fall chum were identified as a stock based on their distinct spawning distribution and run timing.

Spawning Distribution

Most spawning takes place between RM 6 and RM 8 in Skookum Creek.

Spawning Timing

Spawning generally occurs from late October through December.

Genetic Analysis

Allozyme analysis has shown Upper Skookum Creek fall chum salmon to be genetically distinct from all other Washington chum stocks examined (Phelps et al. 1995).

Stock Origin

This is a native stock with wild production.

Hammersley Inlet Summer Chum Profile

SaSI rating is "healthy" in 2002. The escapements of the stock have been strong since the 1993 return year. Total escapement estimates for summer chum from Hammersley Inlet streams are based on index live spawner counts made annually in Johns, Cranberry, and Deer Creeks.

Stock Definition

Hammersley Inlet summer chum were identified as a stock based on their distinct spawning distribution, spawning timing, and genetic composition.

Spawning Distribution

Most spawning takes place in Johns, Cranberry and Deer Creeks.

Spawning Timing

Spawning generally occurs from September through late October.

Genetic Analysis

Allozyme analysis has shown Hammersley Inlet summer chum to be genetically distinct from all other Washington chum stocks examined (Phelps et al. 1995).

Stock Origin

This is a native stock with wild production. The Johns Creek Hatchery was a major contributor to the run from the late 1970s through the mid-1980s and supplemented a large wild escapement into Johns Creek using native broodstock. The hatchery closed in 1991. Currently, escapements in Johns Creek and other Hammersley Inlet streams are the result of natural spawning.

Johns/Mill Creeks Fall Chum Profile

SaSI rating is "healthy" in 2002. This stock has a long-term pattern of relatively stable escapements, with somewhat higher escapements in the 1990s. Total escapement estimates are based on annual index counts of live spawners in Johns and Mill Creeks.

Stock Definition

Johns/Mill Creeks fall chum were identified as a stock based on their distinct spawning distribution and spawning timing. Much of the production in this area comes from wild escapement in Johns Creek. Mill Creek escapement is primarily based on wild spawning fish with a narrower run timing (November to December spawner). However, because of the over-lap in run timing, they can be considered the same stock.

Spawning Distribution

Most spawning takes place in Johns Creek. Spawning also occurs in Mill Creek.

Spawning Timing

Spawning generally occurs from November through early February.

Genetic Analysis

Allozyme analysis has shown Johns/Mill Creek fall chum salmon to have a genetically mixed background. Mill Creek may have a remnant native fall chum population (Phelps et al. 1995).

Stock Origin

This is a mixed stock with wild production. At one point, Hood Canal hatchery chum were introduced into the system. Fisheries were conducted in attempts to remove these fish but were not considered to be effective. Hatchery plants from Hood Canal and other facilities (Minter Creek) may have affected the genetic make-up of the native stock and created a mixed stock.

Goldsborough/Shelton Creeks Fall Chum Profile

SaSI rating is "depressed" in 2002 because of a profile in escapement and a short-term severe decline in 1997, 1999 and 2000. Total escapement estimates are based on annual index counts of live spawners in Goldsborough and Shelton Creeks.

Stock Definition

Golsborough/Shelton Creeks fall chum were identified as a stock based on their distinct spawning distribution and run timing. They have a later run timing than other Hammersley Inlet spawners.

Spawning Distribution

Most spawning takes place in Goldsborough and Shelton Creeks.

Spawning Timing

Spawning generally occurs from late December through early February.

Genetic Analysis

Allozyme analysis has shown Goldsborough/Shelton Creeks fall chum to be genetically distinct from all other Washington chum stocks examined (Phelps et al. 1995).

Stock Origin

This is a native stock with wild production. Although Shelton Creek receives hatchery plants, Goldsborough Creek is dependent on wild escapement.

Case Inlet Summer Chum Profile

SaSI rating is "healthy" in 2002. The escapements of the Case Inlet summer chum salmon stock have been strong since the early 1990s, with one extraordinary escapement of 43,389 spawners in 1996. Total escapement estimates for summer chum in Case Inlet streams are based on index counts of live spawners made annually in Sherwood, Coulter and Rock Creeks.

Stock Definition

Case Inlet summer chum were identified as a stock based on their distinct spawning distribution, spawning timing, and genetic composition.

Spawning Distribution

Most spawning takes place in Sherwood, Coulter and Rocky Creeks.

Spawning Timing

Spawning generally occurs from mid-October through late October.

Genetic Analysis

Allozyme analysis has shown Case Inlet summer chum salmon to be genetically distinct from all other Washington chum stocks examined (Phelps et al. 1995).

Stock Origin

This is a native stock with wild production. Wild escapements in Coulter and Sherwood creek were supplemented by large hatchery program using native broodstock from the late 1970s through the mid-1980s, when the program was discontinued. Currently the stock is sustained entirely by natural spawning.

Case Inlet Fall Chum Profile

SaSI rating is "healthy" in 2002. Escapements for the Case Inlet fall chum stock increased in the early 1980s and were generally high through the 1990s. Total escapement estimates are based on annual index counts of live spawners in Sherwood, Coulter and Rocky Creeks.

Stock Definition

Case Inlet fall chum were identified as a stock based on their distinct spawning distribution, spawning timing, and genetic composition.

Spawning Distribution

Most spawning takes place in Sherwood, Coulter and Rocky Creeks.

Spawning Timing

Spawning generally occurs from early December through mid-January.

Genetic Analysis

Allozyme analysis has shown Case Inlet fall chum salmon to be genetically distinct from all other Washington chum stocks examined (Phelps et al. 1995).

Stock Origin

This is a native stock with wild production.

Coho *(Onchorhynchus kisutch)*

Life History

Adult coho begin to enter streams when water temperatures decrease and flows increase, often making short explorations into the stream and then returning to saltwater. Upstream migration typically takes place during the day and is triggered by a large increase in flow, especially when combined with a high tide. Most coho return to spawn at three years of age. They typically spend four to six months incubating, up to fifteen months rearing in freshwater, then sixteen months feeding in the ocean. Coho spawn in a variety of stream types, including small coastal streams, large rivers, and remote tributaries. They will spawn just about anywhere that suitable gravel (15 cm or smaller in diameter) is present. Sites with groundwater seepage are preferred. The redd is typically located at the head of a riffle to promote good oxygen circulation. The eggs generally hatch in 40 to 60 days depending upon temperature. The alevins initially move downward in the gravel, likely an adaptation to prevent premature emergence of individuals that hatch close to the surface of the streambed (Sandercock 1998).

Fry about 30 mm in length emerge from the gravel about two to three weeks after hatching. Emergence occurs primarily at night. Fry that emerge first are typically larger than later emerging fry. These individuals tend to make up a large proportion of the fingerling population because they are able to out-compete smaller individuals for territories and prey. Following emergence, the fry hide in the substrate during daylight hours. After a few days they begin to swim along the banks and use whatever cover is available. Backwaters, side channels, and small streams are preferred areas, particularly in shaded areas with overhead cover. The fry may move upstream or downstream and occupy areas inaccessible to adult coho. Some coho rear in lakes, but the majority rear in streams where they establish and aggressively defend territories. They may be found in both pools and riffles, but are best adapted to pool habitat. Trout out-compete coho in riffles. The fry are active during daylight hours, defending their territories and making frequent dashes to capture prey (and foreign objects perceived as prey). They settle to the bottom during the night to rest (Sandercock 1998).

Small individuals are often harassed, chased, and nipped by the larger individuals. Complex instream habitat composed of large rocks, large woody debris, and vegetation is important to rearing coho because production is limited by the number of suitable territories present. Displaced fry often end up in less favorable habitat where they are vulnerable to predation. They may also be driven downstream clear to the estuary. Fish that enter the estuary during the first spring or summer of life do not generally survive to adulthood. Coho are visual feeders and prefer food moving in suspension or on the surface. They rarely feed on non-moving food or along the stream bottom. The juveniles usually rear in slower sections of the stream that allow them to capture prey with a minimum of effort. Small streams are the most productive coho areas because they provide more marginal slack water habitat than large streams. The midstream portion of large streams is generally unsuitable for juvenile coho; therefore, any food drifting through this area is unavailable (Sandercock 1998).

Fingerlings move into off-channel habitat when fall freshets begin. Instream cover, side channels, small intermittent streams, and ponds provide shelter from winter storms that could sweep the fish out of the system. They also provide refuge from predators at a time when the fingerlings' swimming ability is limited by cold water temperatures. Beaver ponds provide shelter to avoid high flows during winter and low flows in the summer. However, small coho in ponds are more susceptible to predation from cutthroat trout. When juvenile coho rear in conditions with moderate water temperatures and abundant prey, they grow rapidly. The fry are about 30 mm long at emergence in March. They grow to 60 to 70 mm by September. By March of the second year, the fingerlings are 80 to 95 mm long. The juveniles are about 100 to 130 mm in length by May when they smolt. Exposure to water temperatures of 25ºC (77ºF) or greater is fatal to juvenile coho (Sandercock 1998).

In freshwater, juveniles are subject to predation by numerous animals including: cutthroat and rainbow trout, char, whitefish, sculpins, fish ducks, herons, mink, and otter. Garter snakes, dippers (water ouzel), robins, and crows are also significant consumers of juvenile coho. Coho smolts begin to migrate downstream in the spring. Fish size, stream flows, water temperature, dissolved oxygen levels, photoperiod, and forage availability have all been identified as factors that trigger migration (Shapovalov and Taft 1954). The outmigration generally peaks in May, with most movement occurring at night. The fish grow rapidly in the nearshore waters of the estuary feeding on invertebrates. After attaining a larger size, they shift to feeding on fish, krill, and crab larvae (Sandercock 1998).

Deep South Sound Tributaries Coho Profile

A short-term decline in escapements and run sizes occurred in this and all other South Sound coho stocks in the mid- to late 1990s, largely the outcome of a precipitous plunge in marine survival rates. Escapements are still above historical lows, so the SaSI rating is “healthy” for 2002. A Depressed rating may be warranted if an upward trend

is not observed in the near future. Total escapement estimates are expanded from serial live fish counts in index areas throughout deep South Sound.

Stock Definition

Deep South Sound Tribs coho were identified as a stock based on the geographic proximity and common estuary of the numerous small to medium-sized coho-producing tributaries in deep South Sound and on the common origin (Soos Creek (Green River) and Minter Creek hatcheries) of the hatchery coho that were stocked extensively into streams in this region. These hatchery introductions are expected to have resulted in at least some genetic modification and/or homogenization of the original natural coho stock(s) in deep South Sound.

Spawning Distribution

Spawning takes place in all suitable and accessible streams in WRIA 14, with the most significant runs in Kennedy, Skookum, Mill, Goldsborough, Johns, Deer, Cranberry, Sherwood Creeks.

Spawning Timing

Most spawning occurs from late October to mid-December.

Genetic Analysis

No genetic analysis has been done on Deep South Sound Tributaries coho.

Stock Origin

This is a mixed stock with composite production. Non-native coho are not regularly stocked into Deep South Sound tributaries any longer, but many hatchery strays are observed during natural spawning surveys (Chuck Baranski,, WDFW, personal communication.).

Winter Steelhead Trout *(Onchorhynchus mykiss)*

Life History

Adult winter steelhead generally enter freshwater from November through March. Spawning usually takes place within four months of freshwater entry. The majority of returning adult steelhead are three to four years of age. These fish typically display three distinct life histories: (1) two years in freshwater and one year at sea (about 50%), (2) two years in freshwater and two years in saltwater (about 30%), and (3) three years in freshwater and one year at sea (about 10%). Survival of steelhead to first spawning improves with increased juvenile size at outmigration, hence the prevalence of two or three years of freshwater rearing in the three major life histories. Small groups of adult steelhead enter the stream as water levels rise following storms. The fish generally migrate upstream during daylight hours. Spawning sites are typically located near the head of a riffle (pool tailout). The redd is constructed in medium to

small size gravel and is composed of several egg pockets or "pits." Each pit is typically four inches to one foot deep and about 15 inches in diameter. After egg deposition and fertilization the female covers the pit by moving upstream a few feet and excavating another pit. In the process, the disturbed gravel is washed downstream, covering the prior excavation. The completed redd is about 60 square feet in size (Shapovalov and Taft 1954).

Resident rainbow trout (and cutthroat trout, see below) often congregate near spawning steelhead. These fish are commonly thought to be feeding on dislodged eggs, but the majority are sexually mature males that are likely attempting to participate in the spawning act similar to immature (jack) Pacific salmon. Resident rainbow trout males have been observed spawning with female steelhead in the absence of a male steelhead (Shapovalov and Taft 1954). This behavior may be an important life history strategy that is likely less common today than it was historically (McMillan 2001). Cutthroat trout also readily interbreed with steelhead (e.g. Anon 1921, Hawkins 1997, Johnson et al. 1999).

Unlike Pacific salmon, not all steelhead die following spawning. Some spawned-out steelhead called “kelts” migrate downstream and return to the ocean. These fish are able to mature and spawn again. Steelhead eggs incubate for 19 to 80 days depending upon water temperature (60ºF and 40ºF respectively) and in the absence of high substrate embeddedness are believed to have a hatching success of 80 to 90%. The alevins are about 18 mm in length. Fry 23 to 26 mm in length typically emerge from the gravel two to three weeks after hatching. The fry initially congregate in schools, but eventually disperse up and down the stream, with each individual staking out a territory (similar to coho). By late summer, juvenile steelhead have moved to the swifter portions of the stream. During the fall and winter months, they take shelter in backwaters and eddies to prevent being swept downstream in floodwaters. Larval insects are the principal forage of fry and fingerling steelhead. As the juveniles grow, they consume larger prey including fish. Dislodged salmonid eggs are also important food items during the late fall and winter months (Shapovalov and Taft 1954).

Juvenile steelhead have a diverse suite of life histories, with fish migrating downstream from young-of-the-year (YOY) to four years of age. The bulk of downstream migration takes place in the spring and summer. Young-of-the-year through age two juveniles make up the bulk of downstream migrants with age three and four fish only a small proportion of the outmigration. The typical life history involves migration to the ocean at two years of age, but environmental conditions and sexual development can cause changes in the behavior pattern. Age one and YOY juveniles often remain in the lower portion of the stream or estuary for an additional year prior to migrating to the ocean. Age two and older fish typically migrate to the ocean immediately. The saltwater feeding habits of steelhead are likely similar to coho, with small fish feeding on invertebrates and larger fish feeding on fish (Shapovalov and Taft 1954).

Totten Inlet Winter Steelhead Profile

There are no data with which to rate stock status, so the SaSI status in 2002 continues to be "unknown".

Stock Definition

Totten Inlet winter steelhead were identified as a stock based on their distinct spawning distribution.

Spawning Distribution

Spawning takes place in Totten Inlet tributaries such as Kennedy, Skookum and Schneider Creeks.

Spawning Timing

Spawning timing is unknown but is thought to run from early February through mid-April.

Genetic Analysis

No genetic analysis has been done on Totten Inlet winter steelhead.

Stock Origin

This is a native stock with wild production.

Hammersley Inlet Winter Steelhead Profile

There are no data with which to rate stock status, so the SaSI status in 2002 continues to be "unknown".

Stock Definition

Hammersley Inlet winter steelhead were identified as a stock based on their distinct spawning distribution.

Spawning Distribution

Spawning takes place in Hammersley Inlet tributaries including Mill, Goldsborough, Johns, Cranberry, Deer, Spring, Malaney, Uncle John and Campbell Creeks.

Spawning Timing

Spawning timing is unknown but is thought to run from early February through mid-April.

Genetic Analysis

No genetic analysis has been done on Hammersley Inlet winter steelhead.

Stock Origin

This is a native stock with wild production.

Case Inlet Winter Steelhead Profile

There are no data with which to rate stock status, so the SaSI status in 2002 continues to be "unknown".

Stock Definition

Case/Carr Inlets winter steelhead were identified as a stock based on their distinct spawning distribution.

Spawning Distribution

Spawning takes place in Case Inlet tributaries including Sherwood, Coulter, Dutcher, Artondale, and Jones Creeks and in Carr Inlet tributaries including Minter, Burley, Purdy, McCormick, and Lackey Creeks.

Spawning Timing

Spawning occurs from early February through mid-April.

Genetic Analysis

No genetic analysis has been done on winter steelhead in Case Inlet.

Stock Origin

This is a native stock with wild production.

Coastal Cutthroat Trout *(Onchorhynchus clarki clarki)*

Life History

Coastal cutthroat spawn from late winter through late spring in low gradient reaches of small tributary streams or the lower reaches of larger streams. These streams are typically small with summer low flows often between 0.1 m^3/s and 0.3 m^3/s (~ 3.5 to 10.6 cfs) (Johnston 1982, cited in Trotter 1997). Pea to walnut size gravel is the preferred spawning substrate. Redds are typically constructed in pool tailouts 15 to 45 cm (~ 6 to 18 inches) deep. The deep water of the pool may be used as escape cover. If larger salmonids such as coho are present, cutthroat will migrate upstream above the reaches used by salmon. Repeat spawning female coastal cutthroat produce more eggs of a larger size than first-spawning females. The larger eggs develop into larger alevins that have higher survival than small alevins. Emergence from the gravel typically peaks in mid-April, but may extend from March through June. Newly emerged fry are about 25 mm (~ 1 inch) long. The juveniles spend their first few weeks in lateral habitats including low- velocity backwaters, side channels, and other areas of cover along the channel margin (Trotter 1997).

During the summer months, young-of-the-year (Age-0) cutthroat prefer to rear in pools and other slow-water habitats. However, if coho juveniles are present, cutthroat are often displaced into riffles. Coho emerge earlier and at a larger size than cutthroat. They are able to out-compete cutthroat because of their larger size, aggressive behavior, and body morphology better adapted to pool habitat. Juvenile steelhead may displace juvenile cutthroat from riffles in a similar fashion. Steelhead are more aggressive with a body better adapted to riffle habitat than cutthroat. Interactions between young-of-the-year coho, steelhead, and cutthroat during the summer rearing period may set a natural limit on cutthroat production in streams where all three species are present. Stream-rearing juvenile coastal cutthroat may be feeding generalists, consuming whatever prey is available. Age-0 cutthroat consume both benthic (bottom dwelling) and drift organisms. Age-1 and older cutthroat often eat coho fry up to 50 to 60 mm (~ 2 inches). Cutthroat parr, smolts, and kelts (spawned adults) eat a variety of items including: insect larvae, sand shrimp, and small fish. Territoriality and agonistic behavior between juvenile salmonids decreases with the approach of winter. The juveniles overwinter in deep pools associated with large woody debris and undercut banks, as well as boulders and cobbles that provide interstitial cover. Off-channel pools, side channels, and lakes are also used where available (Trotter 1997).

Puget Sound coastal cutthroat typically smolt at age 2 with an average length of 160 mm (~ 6 inches). Seaward migration begins as early as March and continues through mid-July, with a peak in late May to early June. Anadromy is not well developed in coastal cutthroat trout. They spend little time in saltwater and often remain in the tidewater and estuarine reaches of their home streams. While in saltwater, cutthroat generally travel along the shoreline within 50 km (~ 31 miles) of the home stream and are reluctant to cross deep open water. They grow about 25 mm (~ 1 inch) per month while foraging in salt water. Marine survival of coastal cutthroat is as much as 40% higher than other Pacific salmonids. Predation by Pacific hake, spiny dogfish, harbor seals, and adult salmon likely accounts for the majority of mortality (Trotter 1997).

Coastal cutthroat seldom over winter in salt water. They often return to freshwater the same year they migrated to sea, but not all of these fish are spawners. Few female coastal cutthroat mature sexually before age 4. The immature fish over winter in freshwater then return to saltwater a second time to forage. These fish spawn following their second return to freshwater (Trotter 1997). In Puget Sound only 20 to 27% of first-return females spawned, while nearly all of the first-return males spawned (Johnston 1982, cited in Trotter 1997). In large streams (summer low flows > 1.4 m3/s, ~ 49 cfs) fish enter freshwater from July through November with a peak in September and October. In small streams (summer low flows < 0.6 m3/s, ~ 21 cfs) that flow directly to saltwater, cutthroat enter freshwater from December through March with a peak in December and January. Coastal cutthroat survive spawning quite well (Trotter 1997). Kelts return to saltwater from late March through early April, about

one month earlier than cutthroat smolt outmigration. This timing places the adults in a position to feed on outmigrating juvenile salmonids, particularly pink and chum salmon (Trotter 1997).

Western South Sound Coastal Cutthroat

Coastal cutthroat are distributed throughout WRIA 14. The SaSI rating for the Western South Sound stock complex is "unknown." We have no current quantitative data on abundance or survival with which to assess status. Smolt counts collected by the Washington Department of Fisheries for Mill Creek (Hammersley Inlet) date back to the 1980s and are not useful in determining their current status. Hunter (1980) rated anadromous cutthroat status in many of the tributaries in this region, based on habitat quality. Within more southerly waters the following systems were ranked as good: Sherwood, Campbell, Malaney, Deer, Cranberry, Kennedy, McLane, Deschutes River, and Woodland Creeks. Those identified as fair included Goldsborough, Skookum, and Schneider Creeks. Only Perry Creek received a low rating, while Mill Creek was rated "very good."

Stock Definition

The Western South Sound coastal cutthroat stock complex is thought to be distinct from other South Sound stocks based upon the later timing of freshwater entry exhibited by its anadromous component and its distribution in the small to medium-sized independent streams of south and western Puget Sound. For characteristics such as spawning time, smolt age, age at first spawning and morphology, the differences among stocks are not well defined.

Distribution

The anadromous life history form is likely to be found in most of the above listed systems, but presence and distribution in freshwater may be quite seasonal because of summer and fall low flows. The resident form of this stock complex is present in virtually all perennial independent streams in western South Puget Sound.

Spawning Timing

It is expected that these fish are late-entry. The fluvial form probably inhabits all of the medium-sized streams, and the adfluvial form may be present in as many as 12 lakes within the range of this stock complex. Anadromous spawnings are unknown but are thought to be similar to the North Puget Sound Tribs. Complex which is January through March.

Genetic Analysis

Genetic collections from this region include Kennedy and John's Creeks, which are both significantly different from one another as well as from other South Sound collections.

Stock Origin

Hatchery-origin cutthroat were released in the Deschutes River and McAllister Creek for several years. Interbreeding between hatchery and wild cutthroat is thought to have been unlikely because of high catch rates on hatchery fish and poor survival of hatchery-origin fish in the wild. Consequently, Western South Sound coastal cutthroat are considered native. The stock is maintained by wild production.

Fall Chinook *(Oncorhynchus tshawytscha)*

Life History

Fall Chinook rely on the WRIA 14 nearshore environment for rearing, feeding, and migration. The Chinook found in WRIA 14 streams are of hatchery origin and are not considered self-sustaining stocks.

Ocean type (fall) Chinook typically migrate to sea during the first year of life, normally within three months of emergence. They spend the majority of their life in coastal waters and return to the natal stream in the fall a few days or weeks prior to spawning. In contrast, stream type (spring) Chinook rear for one or more years in fresh water prior to migrating to sea where they undertake extensive ocean migrations. They return to the natal stream in the spring or summer, several months prior to spawning (Healey 1998).

Although Chinook are generally considered to prefer deeper and faster spawning areas than other species in the genus *Oncorhynchus*, measurements recorded in the literature do not suggest that Chinook avoid shallow water and low flows. Their large body size may allow them to hold position in faster currents and displace larger spawning substrates than other Pacific salmon, hence the perceived preference for deeper and faster water. Chinook have been observed spawning in water ranging from ~ 2 inches (5 centimeters) to 15 feet (~ 4.6 meters) deep. They appear to select spawning sites with high subgravel flows. This preference may be related to the increased sensitivity of Chinook eggs to fluctuations in dissolved oxygen levels when compared to other species of Pacific salmon (Chinook produce the largest eggs, yielding a small surface-to-volume ratio) (Healey 1998).

Chinook fry appear to have more difficulty emerging from small substrate than large substrate. Most fry emergence occurs at night. Following emergence the fry move downstream, also principally at night. The fry may continue the downstream migration to the estuary, or take up residence in the stream for a few weeks to a year or more depending upon the life history strategy. Fry migrants typically range in size from 30 to 45 mm fork length. Fingerling migrants are larger, with a range of 50 to 120 mm fork length. While rearing in fresh water, Chinook feed primarily on larval and adult insects and zooplankton (Healey 1998).

Chinook fry feed in estuarine nearshore areas until they reach about 70 mm fork length, at which time they disperse to marine areas. Chinook rearing in estuarine areas are opportunistic feeders and will consume a variety of prey ranging from chironomid larvae and zooplankton to mysids (opossum shrimps) and juvenile fish. Most fall Chinook do not migrate more than 1,000 km (about 620 miles) from their home stream during their ocean residence. Fish, particularly herring and sand lance, are the primary prey of Chinook during their ocean growth phase. However, invertebrates including euphausiids (krill), squid, and crab larvae are also important at times (Healey 1998).

South Sound Tributaries Chinook Stock Profile

The evaluation of the South Sound Tributaries Chinook stock in the 1992 SASSI regarded all naturally spawning fish, including hatchery returns released or escaping above hatchery racks. These hatchery-origin adults, spawning in their basins of origin, were responsible for the large escapement numbers and the healthy rating for this stock in 1992.

In SaSI 2002, the fall Chinook spawning aggregations observed in south Puget Sound independent tributaries are not rated. The Co-managers support this action with the following rationale: (1) The independent tributaries in south Puget Sound are not typical Chinook habitat because of relatively small stream size and low flows during the late summer/early fall spawning season. (2) The current low escapements (outside of streams that support on-station Chinook production programs) are likely the result of past hatchery plants or straying from either current South Sound hatchery production or viable South Sound natural populations. (3) Fall Chinook likely were not historically self-sustaining in these habitats and have little chance of perpetuating themselves through natural production.

We do not regard fall Chinook spawning in generally small independent South Sound streams as being a distinct stock in the same sense that the term is used elsewhere in this inventory.

Spawning Distribution

Most spawning takes place in McAllister Creek, Deschutes River, Percival Creek and other independent tributaries such as Woodland Creek, Mill Creek, Goldsborough Creek, Case Inlet streams, Carr Inlet streams, and East Kitsap streams.

Spawning Timing

Spawning generally occurs from late September through October.

Genetic Analysis

No genetic analysis has been done on South Sound Tribs Chinook.

Stock Origin

South Sound tributaries are streams that we consider probably did not possess sustainable populations of Chinook historically. Present-day Chinook returns are due to the large releases from a number of South Sound hatcheries. Although locally returning Chinook are now used for broodstock at these hatcheries, their ancestry is largely Soos Creek Hatchery (Green River) Chinook.

Pink *(Oncorhynchus gorbuscha)*

Life History

Pink salmon are not known to occur in the freshwater systems of WRIA 14. However, since neighboring WRIAs (e.g., Nisqually) have natural stocks of pink salmon present. It is acknowledged that they may possibly use the WRIA 14 nearshore environment.

Spawning - Pinks use the mainstems of large rivers and some tributaries, often very close to saltwater. Because their fry move directly to sea after emerging, the closer they spawn to saltwater the better. The shorter journey reduces predation and increases survival. Sometimes pink salmon spawn right in saltwater, avoiding freshwater altogether.

Pinks have a very regular life history, living for two years before returning to spawn the next generation. This is why pink runs in Washington occur only every other year; there are no one-year-old or three-year-old fish to establish runs in the other years.

Rearing - As mentioned, pink fry do not rear in freshwater. Immediately after emerging they move downstream to the estuary and rear there for several months before heading out to the open ocean. Because of this, pink fry have no spots, which provide camouflage in streams, but are bright chrome for open water.

Bull Trout *(Oncorhynchus salvelinus)*

Life History

Bull trout reach sexual maturity at between four and seven years of age and are known to live as long as 12 years. They spawn in the fall after temperatures drop below 48 degrees Fahrenheit (8º C), in streams with cold, unpolluted water, clean gravel and cobble substrate, and gentle stream slopes. Many spawning areas are associated with cold water springs or areas where stream flow is influenced by groundwater. Bull trout eggs require a long incubation period compared to other salmon and trout (4-5 months), hatching in late winter or early spring. Fry remain in the stream bed for up to three weeks before emerging. Juvenile fish retain their fondness for the stream bottom and are often found at or near it.

Some bull trout may live near areas where they were hatched. Others migrate from streams to lakes, reservoirs, or saltwater a few weeks after emerging from the gravel.

Salmonid Strategies

Overall Approach

In WRIA 14, the freshwater systems support chum, along with coho, cutthroat, steelhead, sockeye, and Chinook salmon, which are hatchery strays. Sockeye salmon were historically present in the Sherwood Creek/ Mason Lake watershed, which have been extirpated. Adult sockeye are also occasionally observed throughout WRIA 14, their origin is unknown. Juvenile smolt traps have captured sockeye smolts in several streams within the WRIA (Squaxin Island Tribe unpublished data) Salmonid habitat restoration and protection efforts in the freshwater systems will focus on improving natural processes that benefit species indigenous to the area. In the freshwater environment, those species include chum, coho, steelhead, and cutthroat. In the nearshore environment, the focus will be on chum, coho, cutthroat, steelhead, Chinook, bull trout.

Freshwater Strategies

For freshwater environments, WRIA restoration and protection activities:

- In the upper stream reaches will primarily benefit migration, spawning and rearing habitat for coho, cutthroat, and steelhead
- In the lower reaches will benefit migration habitat for all species, spawning habitat for chum, and rearing habitat for coho, cutthroat, and steelhead

Nearshore Strategies

Since the marine nearshore and estuarine habitats are critical to the survival of salmonids in WRIA 14, the Lead Entity has placed a priority emphasis for projects that restore and protect the natural processes in these areas. Nearshore surveys for south Puget Sound show that the nearshore and marine environment support local juvenile salmonids as well as Chinook juveniles from north Puget Sound watersheds (Squaxin Island Juvenile Seining Study 2003-2004). These environments are also essential for the migration, spawning and rearing of forage fish, which are essential prey species for salmon.

- Chapter Three -

Annual High Priority Approach

This chapter examines how WRIA 14 achieves the Vision at a watershed scale.

Conceptual Approach

The WRIA 14 Lead Entity (LE) has taken the approach not to prioritize the subbasins within its small geographic boundary. The LE adopted this approach because there are numerous natural resource groups that are geographically restricted to specific areas for project implementation. Since community involvement is essential to the salmon habitat restoration and preservation process, the LE identified their participation to be important. The LE acknowledges that although projects implemented in less productive subbasins do not necessarily have a high direct benefit for salmon the indirect impacts through such things as outreach and education will have long-term affects throughout numerous subbasins.

To avoid a random, ineffective, and reactive approach to salmon habitat protection and restoration in the watershed, the WRIA has adopted a proactive approach by annually identifying general actions that emphasize the highest needs for the WRIA as a whole. Simply stated, this entails determining which general habitat projects or programs will yield the highest benefit to salmonids in a logical, sequential manner consistent with the WRIA 14 Vision. Setting such priorities is especially important for project and program sponsors to focus their efforts on actions that will deliver the greatest impact towards achieving the Vision.

The WRIA sets these priorities annually for a number of reasons:

1. To account for the progress it makes through projects underway or completed.

2. To recognize that as data gaps close, new issues in the freshwater and nearshore environments will surface that may affect priorities.

3. To acknowledge that the community concerns and issues identified in Chapter Four are dynamic and will change frequently.

With the Annual High Priority Actions, the Salmon Habitat Protection and Restoration Plan remains a flexible, realistic document.

2004 Top Tier Approach

Since the WRIA 14 Lead Entity was in the process of developing their strategy while applicants proposed projects for submittal to the SRF Board, the 2004 "Top Tier Approach" was not available to project sponsors before project development. However, recognizing this guidance would not be available, the project sponsors worked closely with members from the TAG and CAC to verify their projects were a priority action.

- Chapter Four -

Subbasin/Nearshore Assessments and High Priority Habitat Projects & Programs

Overview

This chapter focuses on achieving the WRIA 14 Vision on a subbasin scale by relating the analytical approach used by the WRIA Lead Entity to evaluate the habitat protection and restoration needs within each subbasin and to determine its highest priority action needs. Using a stepwise approach, the chapter

- Summarizes general data about individual subbasins and its associated nearshore within WRIA 14;
- Analyzes the natural processes that create salmon habitat in each one;
- Outlines the limiting habitat features that disrupt those natural processes;
- Identifies all general actions necessary for preserving and/or restoring salmon habitat within each subbasin and its associated nearshore; and
- Establishes a prioritized work schedule for each subbasin and the nearshore that will ultimately produce habitat capable of sustaining healthy populations of salmon

The primary resource for this chapter is the publication, Salmonid Habitat Limiting Factors Water Resource Inventory Area 14, Kennedy-Goldsborough Basin, published in November 2002.

A second resource for developing high priority projects and programs for the nearshore was the draft Chinook and Bull Trout Recovery Approach for the South Puget Sound Nearshore prepared by the South Puget Sound Salmon Recovery Group (2004). Appendix A contains excerpted material from this draft document that is pertinent to WRIA 14 and useful in understanding nearshore conditions and potential restoration actions. This draft report is in a preliminary review stage and the reader should note that changes are likely.

Augmenting this primary resource are published and anecdotal observations by field biologists, culvert inventories, and past project data. Complete citations are included in Appendix B.

The tables entitled “Assessment Overview of Watershed Natural Processes” for each subbasin is from the WRIA 14 LFA and occasionally modified by updated anecdotal

evidence (noted with an "*"). The tables are an adaptation of Table 7 from Salmonid Habitat Limiting Factors Water Resource Inventory Area 14. The assessment ratings used in the tables for each limiting factor and their meaning are as follows:

- For freshwater limiting factors:
  Poor .....Average habitat condition considered not properly functioning
  Fair.....Average habitat condition considered at risk
  Good .....Average habitat condition considered properly functioning
-
- For the nearshore limiting factor of estuary connectivity ("Is there good connection between the freshwater and saltwater systems?"):
  Poor .....Impacted functions (dikes, migration barriers)
  Fair.....Slightly impacted/modified (culvert allows for tidal exchange)
  Good .....Not impacted

The selection of High Priority Habitat Projects & Programs for each subbasin and its associated nearshore is the product of technical committee analysis. Technical committee members are qualified field biologists who are knowledgeable about the attributes and limitations of each subbasin and its associated nearshore.

The rationale for selecting High Priority Habitat Projects & Programs within a subbasin reflects:

- Opportunities for protecting intact habitats that contribute to maintaining properly functioning conditions
- Restoration actions that address "poor" ratings within the "Assessment Overview of Watershed Natural Processes" and that provides the highest benefit to fish in a logical, sequential approach
- Projects that contribute to achieving the WRIA Vision for community support

The ordering of High Priority Projects & Programs does not reflect the priority of one project over another. Furthermore, a "high priority project or program" in one subbasin is on equal footing to a "high priority project or program" in another.

Insert Map for WRIA Here

General Restoration Approaches for Addressing Freshwater Limiting Factors in Subbasins

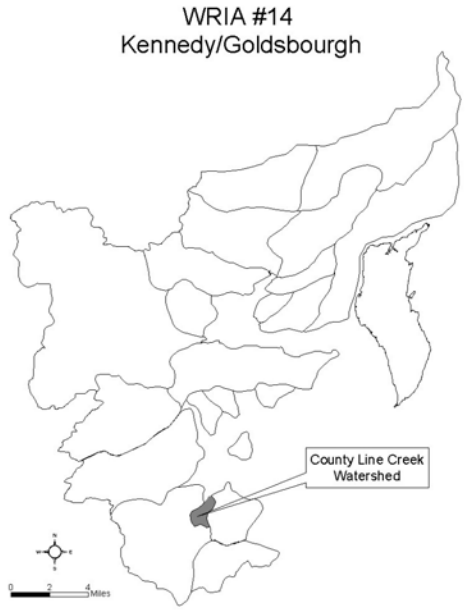
Limiting Factor	Recommendations
Fish passage	Install fish passage structures Replace failed culverts Replace grade control structures
Riparian canopy closure	Improve land use regulation & enforcement Fence livestock out of riparian zones Replant native riparian vegetation, particularly conifers
Streambank condition	Remove or setback dikes, remove riprap Remove meandering channel geometry Replant native riparian vegetation, particularly conifers
Floodplain connectivity	Improve land use regulations & enforcement Prevent development on floodplains & along channel banks Remove or setback dikes, remove riprap Restore meandering channel geometry
Substrate embeddedness	Replant native riparian vegetation Follow guidelines in "Forest & Fish Report" Build fewer roads & maintain existing roads Prevent development on floodplains & along channel banks
Large woody debris total/ *Large woody debris key pieces*	Preserve large coniferous trees in riparian zones Place LWD in spawning & rearing areas Restore meandering channels Leave LWD in channels & replant native riparian vegetation, particularly conifers
Pool frequency	Preserve large coniferous trees in riparian zones Place LWD in spawning & rearing reaches Restore meandering channel geometry Leave LWD in channels & replant native riparian vegetation, particularly conifers
Pool quality	Place LWD in spawning & rearing reaches Restore meandering channel geometry Leave LWD in channels & replant riparian vegetation
Off-channel habitat	Improve land use regulations & enforcement Prohibit dikes/levees and filling of wetlands Remove or setback dikes, remove rip rap Replant native riparian vegetation
Temperature *Dissolved oxygen*	Increase summer instream flows Replant native riparian vegetation, particularly coniferous trees/ protect riparian buffers Maintain natural wetland function (i.e. do not create lakes) Enforce water quality regulations
Water quality/dewatering	Increase summer instream flows Limit development Restore floodplain connectivity Reduce surface water losses on losing reaches Maintain forest cover Enforce water quantity regulations
Change in flow regime	Increase summer instream flows Limit development Restore meandering channel geometry Enforce water quantity regulations
Biological processes	Eradicate exotic fish and riparian plant species Seed upper watersheds with pathogen-free hatchery carcasses Allow beaver populations to rebuild

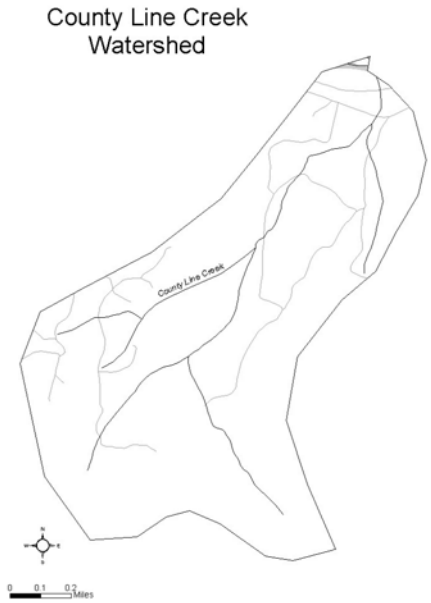
Watershed Summary

This WRIA is unique in that it has vast miles of marine shoreline within Totten Inlet, Little Skookum Inlet, Oakland Bay, Pickering Passage, Case Inlet/North Bay, and Peale Passage. The freshwater systems in WRIA 14 are relatively small streams draining directly into the Puget Sound. The area includes both rural and urban land uses; however, the dominant land use in the upper watersheds is commercial forestry. Residential development occupies only about 1.1% of the basin (Kuttel 2002).

Oakland Bay contains the urban center for the City of Shelton with some outlying rural residential development. The remaining inlets, bays, and passages primarily contain forested landscapes with rural residential development and high densities of residential development along the marine shorelines. Many of these marine shorelines contain bulkheads constructed of riprap or concrete to alleviate loss of land through erosion. Bank-hardening studies need to be initiated to identify restoration sites where ineffective bulkheads are having negative impacts to the nearshore area. The condition of WRIA 14 streams range from highly urban streams (e.g. Shelton Creek) to healthy systems (e.g. Kennedy Creek). For many streams, there are significant data gaps because the stream reaches have not been surveyed quantitatively. This lack of habitat condition information creates a challenge to effectively addressing salmon habitat restoration/protection efforts in WRIA 14.

County Line Creek





Basin	Totten Inlet
Watershed Acreage	715 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, steelhead and cutthroat ► Three stocks in the freshwater – coho, chum and cutthroat
Land Use	Commercial forestlands with limited rural residential development
Total Stream Miles	2.0 miles
Anadromous Stream Miles	2.0 miles
Current Land Use Regulations	0.2 miles type 1 waters; 0.8 miles type 3; 0.4 miles type 4; 2.3 miles type 5; 1.6 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	None
Community Involvement	Unknown

Ownership Pattern

The majority of the watershed is in commercially managed timberlands with small amounts of rural residential development. DNR owns a Natural Areas Preserve at the estuary.

Watershed Description

County Line Creek is an undeveloped stream with many intact natural processes that appear to be in good health. The abundant chum run that returns each autumn to County Line creek provides large amounts of marine derived nutrients to the basin. While timberlands dominate the watershed, there are small amounts of rural residential development. The substantial riparian buffer along the creek consists mostly of deciduous species and with very few conifers for LWD recruitment. The construction of US 101 adversely altered prime chum spawning areas on the creek near the mouth, although fish passage still occurs to allow access upstream. A partial barrier at RM 0.5 exists, limiting upstream juvenile migration.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Poor	Data Gap	Data Gap	Data Gap	Poor	Poor	*Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Fair	Good	Data Gap	Data Gap	Data Gap	Data Gap	Fair	Good

High Priority Habitat Projects & Programs

- Protect the riparian corridor of the anadromous reach. As much of the subbasin has not been impacted, protect the existing habitat from development would be an effective strategy for salmon.

- Restore riparian corridor to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species (incorporate additional conifer in the riparian corridor) in the lower reaches.

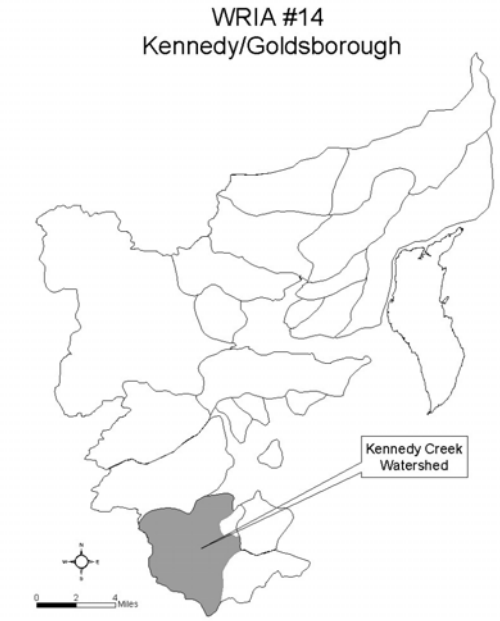
    - Conduct a riparian assessment to identify appropriate locations for riparian restoration actions.

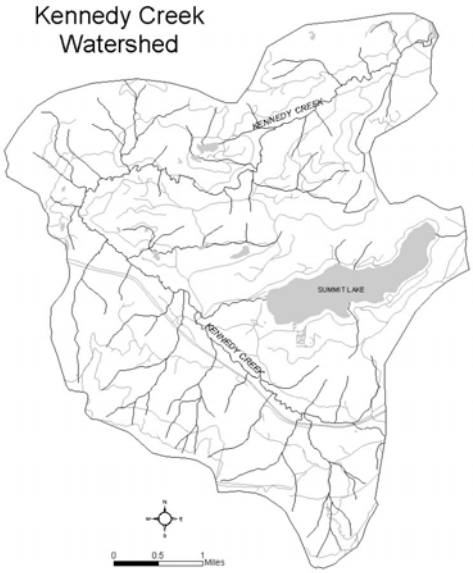
    - Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

Additional Priority Habitat Projects & Programs

- Correct ‘partial’ fish passage barrier located at RM 0.5.

Kennedy Creek





Basin	Totten Inlet
Watershed Acreage	12,660 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, steelhead, and cutthroat ► Freshwater: Chinook, coho, chum, steelhead, and cutthroat
Land Use	Commercial timber in the upper reaches, private ownership with limited rural residential in the valley floor through the middle reach, and DNR at the estuary in a Natural Area Preserve
Total Stream Miles	10 miles
Anadromous Stream Miles	2.5 miles (natural falls)
Current Land Use Regulations	19.5 miles type 1 waters; 1.2 miles type 2; 13.7 miles type 3; 6.6 miles type 4; 14.4 miles type 5; 35.5 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Fecal coliform, temperature
Community Involvement	Excellent outreach location at the 'Kennedy Creek Salmon Trail'

Ownership Pattern

Commercially managed forestlands dominate the headwaters of Kennedy Creek, with a transition to deciduous forests and pasture lands along the valley floor held in private ownership. Taylor Shellfish Company owns portions of the watershed, with some light rural residential in the middle stretch of the creek. U.S. 101 and the Old Olympic Highway impact the lower half-mile of the creek and its estuary where DNR owns and manages a Natural Areas Preserve.

Watershed Description

Silviculture, agriculture, and rural residential land uses in this basin have maintained many natural processes, especially the natural hydrology. Portions of Kennedy and its tributary, Fiscus Creek, run along an educational trail maintained by the South Puget Sound Salmon Enhancement Group under a 20-year lease from Taylor Shellfish Company. No man-made barriers exist on the system, allowing spawning and rearing up to RM 2.5. At this point a natural falls inhibit anadromous fish access, although resident cutthroat exist further upstream. Kennedy Creek has one of the largest chum runs in the South Sound, averaging 30,000 spawners each year. Coho, steelhead, and sea run cutthroat also utilize the stream in smaller numbers. The population of sea run cutthroat is thought to be healthy, although population numbers are not known. Their main diet consists of chum eggs, which they follow upstream. The creek has a naturally occurring high level of fine sediment.

The number of large woody debris key pieces is fair to poor and directly relates to the poor quality of canopy closure. Development could threaten water quantity if it converts the upper watershed converts from it present status of managed coniferous forests. The lower portion of the creek is primarily comprised of deciduous forests and pasturelands.

The estuary provides forage for all anadromous species present in the WRIA, including bull trout and Puget Sound Chinook. As chum rear in the estuary environment, the quality and complexity is extremely important to continue the sustaining of this species as dominant in the watershed. Little is known of the off-channel rearing areas for Coho and sea run cutthroat, though generally low-gradient streams have typically few of these respite areas.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair-Poor	Data Gap	Poor	Poor	Data Gap	Fair-Poor	Good-Fair	Fair-Poor	*Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Good-Poor	Good-Poor	Data Gap	Data Gap	Data Gap	Data Gap	Fair	Good

High Priority Habitat Projects & Programs

- Restore riparian corridor in the lower mile of Kennedy Creek. The primary problem with the creek is the lack of riparian cover in the lower reaches resulting in low LWD key piece recruitment. A solution to this would be to plant and maintain a functioning riparian zone and place key pieces strategically along the banks to add complexity and recruit additional pieces to form log jams. An engineered log jam would also be an alternative.

- Encourage continued outreach activities. The continued management of the Kennedy Creek trail creates a powerful stewardship ethic for students and the community, therefore supporting this effort is important. Additionally, maintaining the upper watershed in managed forestry should be a priority, if the status changes, propose acquisition along key areas.

- Off-channel assessment. An assessment of the off-channel habitat, riparian condition and floodplain connectivity would enable the specific actions to be taken addressing those data gaps.

- Provide long-term conservation of Kennedy Creek riparian corridor within the first 5 miles. Preserve areas within the Kennedy Creek watershed that are not already in a protective status.

- Explore opportunities to keep Kennedy Creek watershed in commercial forestry.

- Restore riparian corridor in the upper and middle reaches to provide shade, stabilize streambanks, and recruit LWD. Plant appropriate species (incorporate additional conifer in the riparian corridor).

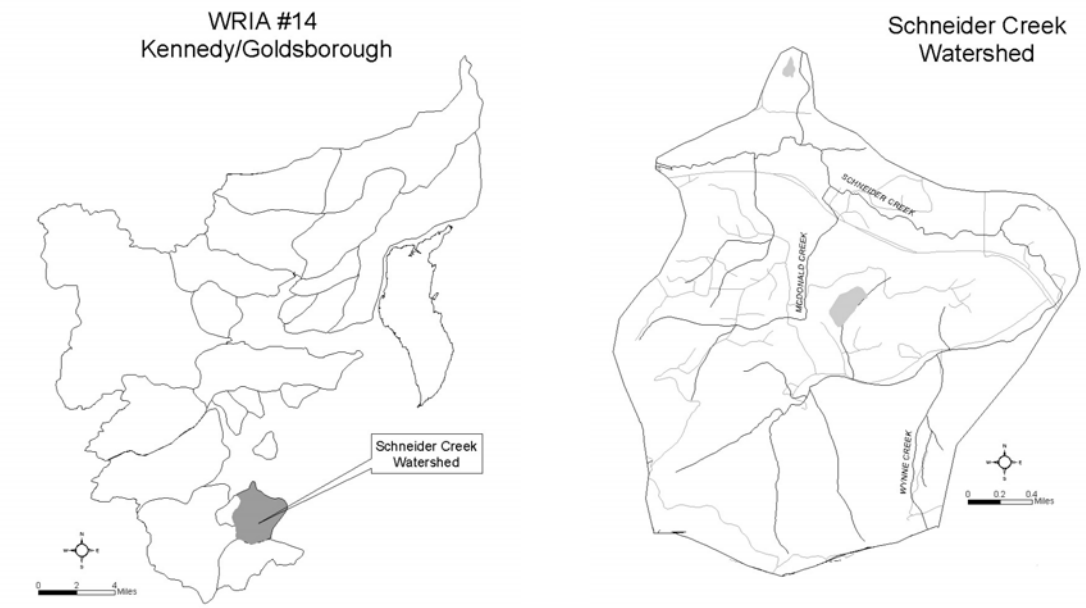
    - Follow prescriptions identified in the watershed analysis.

- Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

Additional Priority Habitat Projects & Programs

- Address ORV usage through stream and riparian corridor from BPA power lines to the salmon nature trail.
- Identify and correct areas where livestock have direct access to the upper reaches of Kennedy Creek (restore riparian functions).

Schneider Creek



Basin	Totten Inlet
Watershed Acreage	3,710 acres
Anadromous Salmonid Use	► Nearshore: coho, chum, steelhead, cutthroat, Chinook, and Bull trout ► Freshwater: coho, chum, steelhead, and cutthroat
Land Use	Primarily commercial forestland with some rural/ agricultural land and a small urban development at Steamboat Island
Total Stream Miles	5.3 miles
Anadromous Stream Miles	5.3 miles
Current Land Use Regulations	0.2 miles of type 1 waters; 2.8 miles of type 2 waters; 6 miles of type 3 waters; 1.7 miles of type 4 waters; 3.2 miles of type 5 waters; 8.2 miles of type 9 waters. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Fecal Coliform
Community Involvement	Valley is owned by cooperative landowner that provides volunteer and educational opportunities.

Ownership Pattern

The headwaters of Schneider Creek are predominantly in timber production, owned by DNR. The valley floor, which is mostly under single ownership, has a mix of agricultural uses that include timber, hay, and livestock production. This landowner has a timber harvest plan based on sustainable forestry concepts and has received several awards for wildlife stewardship. There is a small urban area located along Steamboat Island Road; a larger proposal currently proposed here may place unwanted pressures on this stream system.

Watershed Description

Many natural processes are intact due to more compatible land uses along the upper watershed. However, much of the fine sedimentation occurring in Schneider Creek is a product of actively managed forests at the headwaters. This substrate embeddedness limits spawning success for all species present in the watershed. As the stream runs through the valley floor, it enters farmland in hay production that has little riparian buffer, which limits the ability of the creek to recruit LWD. The current landowner has undertaken several revegetation projects in this section through partnerships with local groups such as SPSSEG and Stream Team. Beaver dams have converted large areas of the valley floor into wetlands.

The intact estuary at Totten Inlet provides tidal exchange and quality estuary habitat for all anadromous species present. Towards the mouth, a private developer has proposed constructing a convention center to serve the entire South Sound area that could negatively impact this area. Large wetlands offer some off-channel juvenile rearing habitat upstream from U.S. 101. However, there is little information available about the rearing habitat downstream from U.S. 101 aside from several replanting projects that have occurred in tandem with WSDOT. Beavers have created a pond downstream from U.S. 101 has stymied these replanting efforts.

Habitat Condition Ratings

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Poor	Fair	Fair	Poor	Good-Poor	Poor	*Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Fair-Poor	Good-Fair	Data Gap	Data Gap	Data Gap	Fair	Fair	Good

High Priority Habitat Projects & Programs

- Partner with Thurston County to ensure the estuary and nearshore are protected e.g., easement programs, and/or acquisition. Partnering with current county regulations to protect the waterfront and estuary in Totten Inlet is a highly effective method for preventing degradation before it occurs.

- Restore riparian corridor to provide shade, stabilize streambanks and recruit LWD. Utilize Thurston CD riparian assessment to locate riparian restoration sites. Plant appropriate species.

    - Partner with the primary landowner to conduct an assessment of the current projects and develop an action plan for future revegetation projects. The riparian buffer above U.S. 101 is in poor condition, but is owned primarily by one cooperative landowner who has undertaken several revegetation projects and is willing to use his tree farm as a demonstration site for school children. There exists a beaver dam that provides rearing for Coho and cutthroat, though it floods the landowner's fields with each major rain event. An agreement that creates incentive for the landowner to maintain contiguous ownership of the land while re-establishing an effective riparian buffer would be a mechanism for cooperation and change that would positively impact Schneider creek

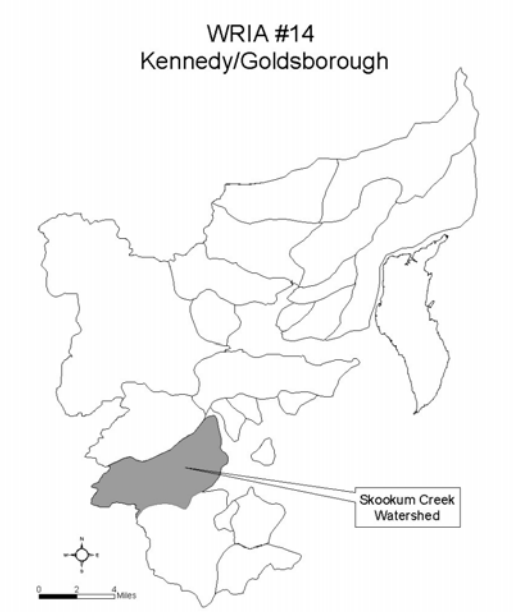
    - Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

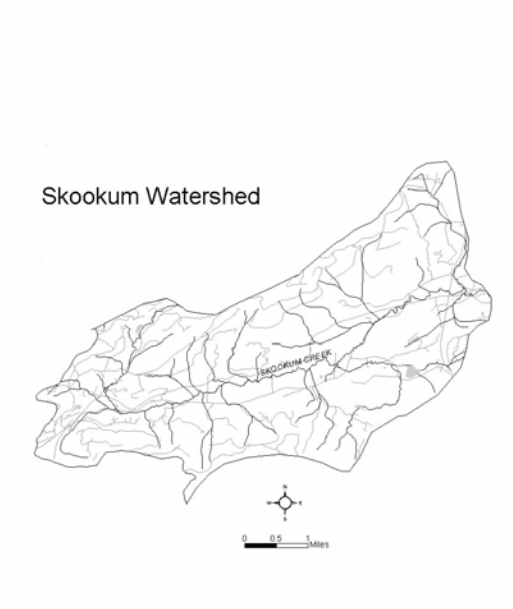
Additional Priority Habitat Projects & Programs

- Maintain vegetative cover to reduce runoff and erosion that lead to fine sediment deposition. Assure timberland owners within Schneider Creek Basin are in compliance with current regulations and utilizing directions identified in the 199x watershed analysis)

- Educate landowners located in the lower reach of the Schneider Creek Basin to increase compliance with landuse regulations and voluntary implementation of best management practices.

Skookum Creek





Basin	Skookum Inlet
Watershed Acreage	12,150 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, steelhead, and cutthroat ► Freshwater: coho, chum, steelhead, and cutthroat
Land Use	Commercial timber, agriculture, rural residential, urban development
Total Stream Miles	9 miles
Anadromous Stream Miles	9 miles
Current Land Use Regulations	6.4 miles type 1 waters; 1.3 miles type 2; 17.1 miles type 3; 6.9 miles type 4; 12.0 miles type 5; 22.8 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Fecal coliform, temperature
Community Involvement	Unknown

Ownership Pattern

Commercial timberlands dominate the headwaters and upper watershed, while agricultural pasturelands, rural residential and urban development exist on the valley floor through the lowlands. The Squaxin Island Tribe owns portions of land in the lower reaches of Skookum Creek and its tributaries as it runs through the reservation.

Watershed Description

Skookum Creek is a significant watershed with numerous tributaries providing additional spawning and rearing habitat for salmonids. Little is known of the off-channel habitat except for the heavy use of this system by beavers, suggesting rearing potential for coho and cutthroat. There exists substantial LWD in the system, with a significant logjam at RM 4. Work has been undertaken to place additional wood in the tributaries, with substantial LWD and key pieces being added to Reitdorf Creek, a left-bank tributary, using helicopters in 2002. Several key agricultural landowners in the valley have begun working with cooperators to receive farm plans, riparian plantings, additional LWD placement, and a culvert removal on Little Skookum Valley Creek, a right-bank tributary. McDonald Creek, a right-bank tributary, is the focus to two proposed Family Forest Fish Passage Program projects, each removing partial barriers upstream of a WDFW passable fishway. Burlington Northern railroad operates through this watershed, with numerous crossings through both the left-bank tributaries and the mainstem. These crossing have undergone initial evaluation, but require additional attention as little is known about the impacts of these partial and full barriers on the system.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Poor	Poor	Poor	Fair	Good	Poor	*Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Fair	Poor	Data Gap	Data Gap	Good-Poor	Poor	Data Gap	Good

High Priority Habitat Projects & Programs

- Protect and preserve the estuary. Through protection and acquisition efforts or the expansion of the DNR Natural Area Preserve, this important habitat is a priority for protection.

- Current agricultural practices at the mouth of Skookum creek need implementation of BMPs.

- Investigate stand pipe, pond and potential impacts at the mouth.

- Assess the impact of the railroad on the left-bank tributaries and the mainstem. Several partial and total barriers exist as the railroad crosses the stream, including a rock culvert that poses a total blockage on what is believed to be the mainstem. Additional information is required to inform project related decisions to remedy these problems and create a cooperative relationship with project partners.

- Protect, preserve and restore riparian corridor above RM 6.

- Improve riparian forest buffer on the valley floor. As the creek runs through the valley floor, much of the canopy disappears into fields, creating the need for the restoration of the riparian corridor with conifers to decrease the temperature problems present in the creek.

    - Feasibility study to address and restore stream channel incision from the mouth through the valley.

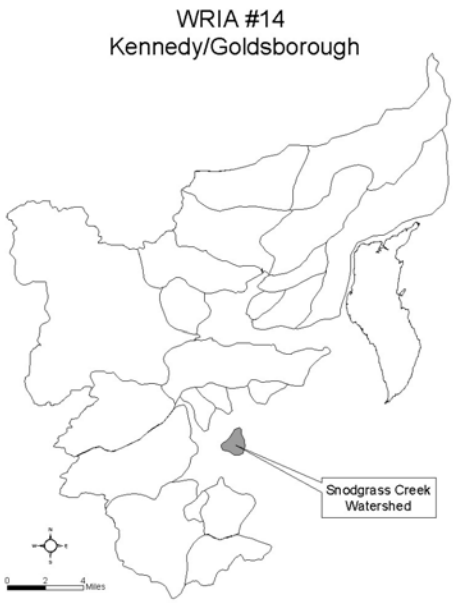
Additional Priority Habitat Projects & Programs

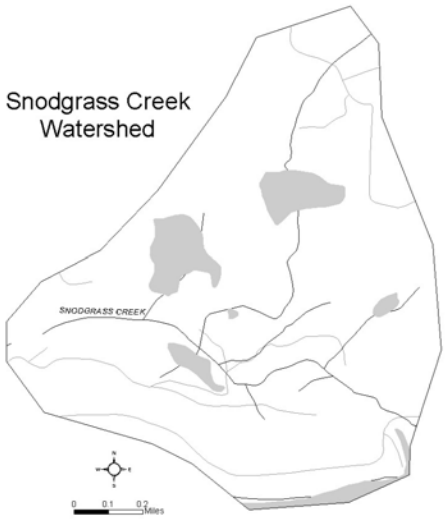
- Determine impacts of the NRCS wetland impoundment structure located on the McDonald farm. Determine possibility to fix.

- Hurley Waldrup valley needs efforts to correct riparian corridor and have landowners implement BMP's.

- Preserve the uppermost 0.5 miles of Hurley Waldrup Creek valley that has intact habitat (multiple landowners).

Snodgrass Creek





Basin	Skookum Inlet
Watershed Acreage	700 acres
Anadromous Salmonid Use	► Nearshore: Chinook; bull trout; chum; coho and cutthroat ► Freshwater: coho, chum, and cutthroat
Land Use	Commercial forestry and shellfish growers
Total Stream Miles	1 mile
Anadromous Stream Miles	1 mile
Current Land Use Regulations	0.7miles type 1 waters; 0.8 miles type 2; 0.6 miles type 3; 4.5 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	None
Community Involvement	Unknown

Ownership Pattern

The watershed is primarily under commercial timber company ownership, with commercial shellfish operations at the mouth.

Watershed Description

Limited information is available on this small watershed draining from wetlands at the headwaters to Totten Inlet the outlet. Deciduous forests make up much of the riparian corridor, with virtually no residential development. Outside the riparian buffer, much of the watershed has been recently logged. The stream substrate consists of spawning gravel throughout the system, while steep slopes limit the off-channel habitat except for several ponds providing rearing habitat. The estuary is the strength of the system, comprised of a small cove and a spit ideal for forage and rearing. Shellfish growers use some of the estuary and they constructed a berm to prevent freshwater intrusion onto the clam and oyster beds.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Data Gap	G	G	G	N/A	Data Gap	Poor	Poor	* Poor

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Poor	Data Gap	N/A	Data Gap	Data Gap	Data Gap	Data Gap	Data Gap

High Priority Habitat Projects & Programs

- Protect the estuary and evaluate the culvert barrier status. A large tidal culvert exists at the mouth that backwaters during the tidal exchange, restricting the free flowing mixing of fresh and saltwater. The status of the culvert remains to be established by WDFW as the culvert inventory could not evaluate tidal culverts.

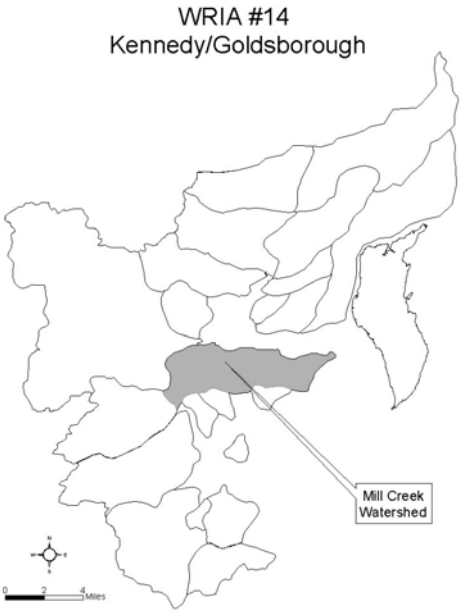
- Restore riparian corridor to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species (incorporate additional conifer in the riparian corridor). Most of this basin's riparian corridor has good riparian conditions.

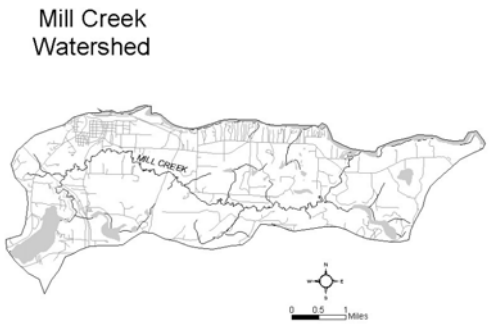
    - Conduct a riparian assessment to identify appropriate locations for riparian restoration actions.

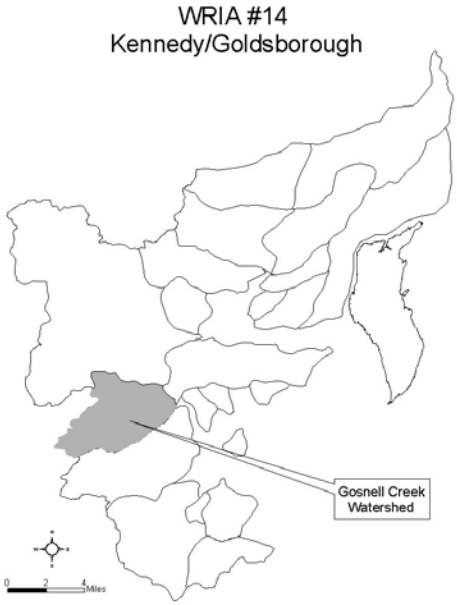
    - Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

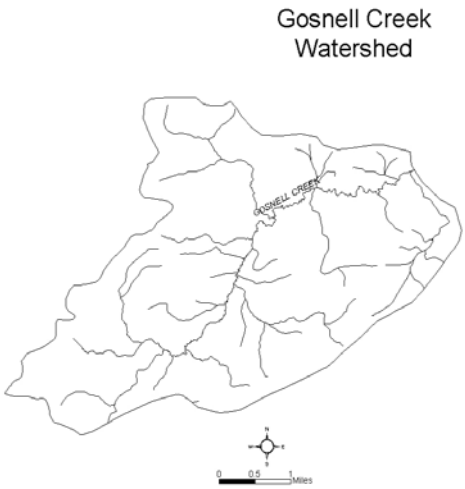
- Headwater wetlands need protection and restoration with native vegetation.

Gosnell Creek & Mill Creek









Basin	Hammersley Inlet
Watershed Acreage	20,806 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, steelhead, and cutthroat ► Freshwater: coho, chum, steelhead, and cutthroat
Land Use	Commercial timber, rural residential, BPA
Total Stream Miles	21 miles
Anadromous Stream Miles	21 miles
Current Land Use Regulations	36.0 miles type 1 waters; 1.8 miles type 2; 18.6 miles type 3; 6.7 miles type 4; 13.5 miles type 5; 54.0 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Temperature (Mill)
Community Involvement	Unknown

Ownership Pattern

The headwaters of Gosnell Creek are owned by Green Diamond Resource Company and held in commercially managed forestland. Rural residential runs sporadically throughout the system, with heavier development surrounding Lake Isabella and down though Mill Creek. A Bonneville Power Administration power line runs adjacent to Goat Hill Farm Creek, a tributary, impacting the riparian area of the stream.

Watershed Description

Many of the natural processes are intact due to silviculture activities; however, agricultural practices and some rural development have impacted the mainstem stream network. Gosnell Creek emanates from a 20-acre wetland complex called Mud Lakes, owned by Green Diamond Resource Company. Livestock exclusion fencing prevents access to the water in some places, but fencing is still a necessity in many reaches of the stream. Lake Isabella, a shallow lake that forms the mouth of Gosnell Creek and the headwaters of Mill Creek, is affected by seasonal thermal warming from sunlight, which contributes to the high temperatures in Mill Creek. WDFW maintains a recreational fishery in the lake, which hosts year-round fishing, impacting coastal cutthroat, steelhead, and coho smolts as incidental by-catch.

Gosnell Creek has agriculture at the mouth above the lake and an extensive new development that surrounds portions of the lake and extends up the lower portions of the creek. Mainstem Gosnell provides cool clean water to the system, while the majority of spawning occurs in the tributaries. Several significant tributaries contribute 4.5 miles of clean, cold water and gravel for spawning with off-channel areas ideal for rearing. Rock Creek, a 1.5-mile tributary to Gosnell at RM 2, is a WDFW index stream

for coho. It has intact riparian areas, no human made passage barriers, excellent gravel, and limited rural development in a private community that runs its length. Mystery Creek is a 1.5-mile right-bank perennial tributary at RM 1.5 that offers good riparian cover and gravel and very limited residential development. Goat Hill Farm creek empties into Gosnell Creek at RM 0.2 just above Lake Isabella and contributes an additional 1.5 miles of spawning and rearing habitat. Livestock currently have access to the creek where a cooperative landowner is working with the South Puget Sound Salmon Enhancement Group (SPSSEG) to prevent livestock access and replace a fish blocking culvert at RM 0.4. This culvert project is a partnership with the Family Forest Fish Passage Program, Simpson and SPSSEG, with the intent to replace the blockage in summer, 2004.

Mill Creek originates at Lake Isabella and extends 9 miles to the mouth in Hammersley Inlet. Development has largely cleared the creek of its riparian area. All major road crossings are bridges, offering excellent passage to salmonids upstream to spawn and rear in Gosnell and its tributaries. Chum and coho are the majority of salmonid spawners in Mill Creek, taking advantage of the underground upwellings present in the system.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Poor	Fair	Fair	Poor	Fair	Fair	*Good (Mill Creek)

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Fair	Fair	Good	Good-Poor	Data Gap	Data Gap	Data Gap	Fair

High Priority Habitat Projects & Programs

- Livestock exclusion fencing on Gosnell creek from RM 1 through 3. Cattle are kept in this area where some fencing exists but more is needed. Riparian planting in tandem with fencing will restore function.
    - Address trampled banks and excessive reed canary grass.
- Preserve headwaters at Mud Lakes. A 20-acre wetland complex comprises the headwaters of Gosnell Creek. Working with Green Diamond Resource Company to ensure the protection of this area and support their RMAP for continued cool, clean water and limited fine sediment transport is very important to the health of the entire watershed.

- Restore/preserve riparian corridor to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species.

    - A comprehensive riparian assessment is needed in Gosnell and Mill Creeks to identify landowners for riparian planting. Temperature is a key limiting factor on Mill Creek, where residential development has severely altered the riparian corridor. A project that identifies willing landowners and designs planting plans to restore this area is a high priority. Some areas have already been identified for restoration actions such as the lower two miles of Gosnell Creek and portions of Rock Creek.

    - Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

    - Preserve current instream temperatures in Gosnell Creek (currently meets water quality standards).

- Utilize WRIA 14 culvert inventory to identify fish passage barriers to be replaced.

    - Replace blocking culvert on Goat Hill Farm Creek. This blockage was identified through a fish passage inventory, chosen by the WRIA 14 TAG as high priority and designed to 30%. Replacing this culvert will restore rearing and spawning habitat for Coho and cutthroat off mainstem Gosnell.

- Determine and address causes of high temperatures in Mill Creek (refer to WRIA 14 Watershed Management Plan).

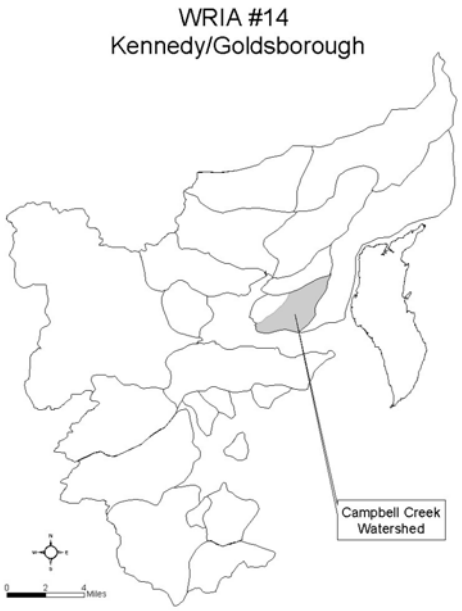
Additional Priority Habitat Projects & Programs

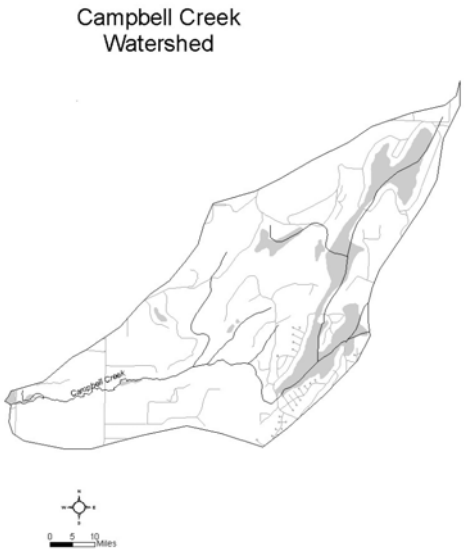
- Determine the feasibility to remove exotic fish species (eg. bass) from the Mill Creek.

- Investigate freshwater mussel decline and their survival linkage to salmon.

- Educate landowners located in the Mill and Gosnell Creeks to increase compliance with land use regulations (Critical Areas Ordinances) and voluntary implementation of best management practices (increase riparian buffer widths).

Campbell Creek





Basin	Oakland Bay
Watershed Acreage	3,318 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, cutthroat and steelhead. ► Four species in the freshwater: coho, chum, steelhead, and cutthroat
Land Use	Residential
Total Stream Miles	2.5 miles
Anadromous Stream Miles	2.5 miles
Current Land Use Regulations	11.8 miles of type 1 waters; 1.3 miles of type 2; 2.6 miles type 3; 2.2 miles type 4; 1.6 miles type 5; 2.2 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Fecal coliform
Citizen Involvement	Unknown

Ownership Pattern

The watershed is in private residential ownership.

Watershed Description

Campbell Creek is a relatively intact stream, with headwaters at Phillips Lake, a dredged wetland lake. The riparian corridor is functioning and the stream has good gravels for spawning and LWD for refuge. The creek, however, experiences low summer flows. A bridge at the mouth allows for passage of all fish species and the stream to function properly. The estuary is comprised of mud flats with shellfish dotted throughout.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Poor	Fair	*Fair	Poor	Fair-Poor	Fair-Poor	Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Fair-Poor	Good	Poor	Poor	Good-Poor	Data Gap	Data Gap	Poor

High Priority Habitat Projects & Programs

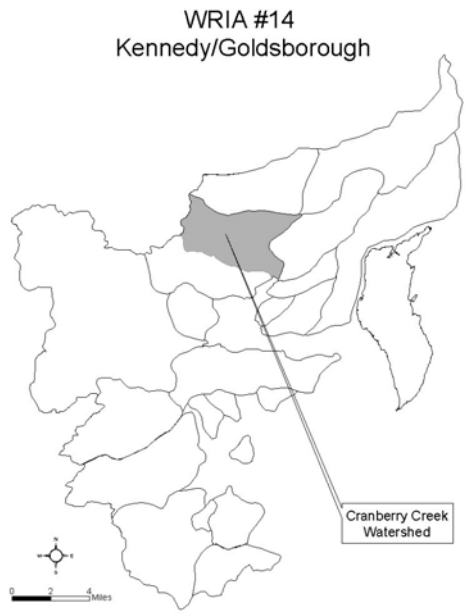
- Restore riparian corridor to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species.
    - Conduct a riparian assessment to identify appropriate locations for riparian restoration actions.
    - Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.
- Identify and correct areas where livestock have direct access to Campbell Creek (restore riparian functions). Livestock are present along the majority of the stream. Maintain vegetative cover to reduce runoff and erosion that lead to fine sediment deposition.
- Protect and restore headwater wetlands through Mason County land use regulations (high development pressure).
    - Conserve available areas in the Phillips Lake headwaters from high impact development pressures (good land use planning).

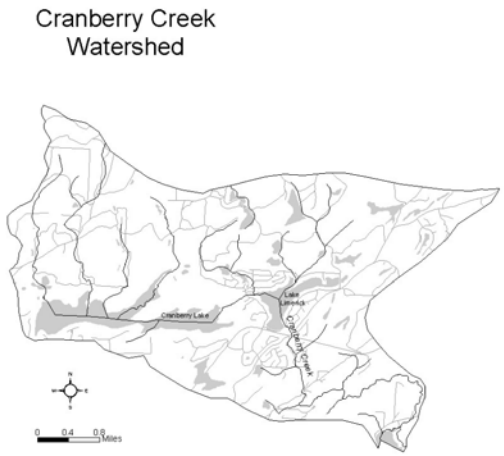
- Investigate wetland to identify if manmade passage barrier exists.

Additional Priority Habitat Projects & Programs

- Educate landowners located in the Campbell Creek Basin to increase compliance with landuse regulations (Critical Areas Ordinances) and voluntary implementation of best management practices.
- Utilize WRIA 14 culvert inventory to identify fish passage barriers to be replaced.

Cranberry Creek





Basin	Oakland Bay
Watershed Acreage	9,162 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, sockeye, steelhead, and cutthroat ► Freshwater: coho, chum, sockeye, steelhead, and cutthroat
Land Use	Rural residential, commercial timber
Total Stream Miles	9.4 miles
Anadromous Stream Miles	9.4 miles
Current Land Use Regulations	21.1 miles of type 1 waters; 1.2 miles type 2; 2.4 miles type 3; 9.3 miles type 4; 7.7 miles type 5; 26.6 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Temperature
Community Involvement	Improve landowner education on natural resource issues in the Lake Limerick Homeowner's Association.

Ownership Pattern

Private rural development is scattered throughout the system. A dominate landowner in the watershed is Green Diamond Resource Company. Private shellfish growers own the tidelands.

Watershed Description

Cranberry Creek has many functioning natural processes due to limited development and silviculture along the stream. There are spawning gravels throughout the creek, but due to natural geology, hardpan is present in some reaches. Substrate embeddedness in some areas does limit spawning success for all species in the watershed. The headwaters are a dredged wetland lake, Lake Limerick, with a dam and fish ladder at the outlet. The Squaxin Island Tribe operates a smolt trap at the fish ladder. The lake hosts warm water predator species such as bass, competing with Coho and the occasional sockeye juveniles. The creek empties into the intact estuary of Oakland Bay, which provides tidal exchange and quality estuary habitat for all anadromous species. The estuary also provides extensive shellfish growing at the mouth. Oakland Bay contributes 40% of the Nation's Manila clams, making shellfish growing an important industry in the watershed.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Good	Data Gap	Fair	Fair	Good-Fair	Fair	*Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Fair	Good	Good	Poor	Good-Poor	Poor	Poor	FairPoor

High Priority Habitat Projects & Programs

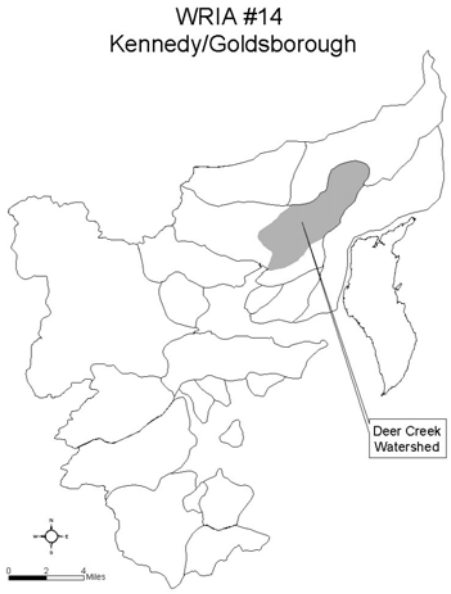
- Preserve upper watershed wetland complex functions through acquisitions, easements, trusts, etc.
- Address instream flow issues (refer to Watershed Management Plan and Squaxin Island Tribe's hydrologic study – 2004).
- Maintain properly functioning riparian corridor along streams and wetlands to help address instream temperature problems.

- Explore opportunities to preserve the section below Highway 3 (includes mouth and estuary).

Additional Priority Habitat Projects & Programs

- Educate landowners located in the Cranberry Creek Basin to increase compliance with landuse regulations (Critical Areas Ordinances) and voluntary implementation of best management practices.
- Determine the feasibility to remove exotic fish species (ie. bass) from the Cranberry Creek Basin.

Deer Creek



Basin	Oakland Bay
Watershed Acreage	8,807 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, cutthroat, and steelhead ► Freshwater: coho, chum, steelhead, and cutthroat
Land Use	Rural residential, commercial timber, Burlington Northern
Total Stream Miles	8.5 miles
Anadromous Stream Miles	8.5 miles
Current Land Use Regulations	5.9 miles type 1 waters; 1.7 miles type 2; 7.9 type 3; 9.3 miles type 4; 5.1 miles type 5; 10.5 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	None
Community Involvement	Unknown

Ownership Pattern

Private rural development is scattered throughout the system. A dominate landowner in the watershed is Green Diamond Resource Company. Private shellfish growers own the tidelands.

Watershed Description

Deer Creek has many functioning natural processes due to limited development and silviculture along the stream. There are spawning gravels throughout the creek, but due to natural geology, hardpan is present in some reaches. Substrate embeddedness in some areas limits spawning success for all species present in the watershed.

Spring Creek enters Deer Creek approximately 50 meters from the estuary, contributing 1.75 miles of habitat for chum, coho, and cutthroat. Spring creek has a wetland headwaters and much of the watershed is rural with cooperative landowners who have participated in numerous restoration projects. These projects include the construction of an off-channel pond, a culvert replacement, a spawning viewing platform for Pioneer School students and revegetation of the lower section in forestland. There is good gravel throughout and several areas of significant key pieces of LWD, particularly at RM 0.5. Off-channel rearing opportunities exist in the wetlands at the headwaters. The upper section in particular is rural and intact.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Poor	Poor	Good	Poor	Fair	Poor	*Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Good	Good	Good	Data Gap	Good	Data Gap	Data Gap	FairPoor

High Priority Habitat Projects & Programs

- Spring creek: Protection. Work with landowners and biologists to research and target areas for protection.

- Restore riparian corridor to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species.

    - Conduct a riparian assessment to identify appropriate locations for riparian restoration actions.

- Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

- Protect headwater wetlands through Mason County land use regulations (high development pressure).

- Preserve essential habitat features that contribute to properly functioning conditions. This area has sparse low-density development which provides high potential for protection actions. Conduct an assessment to identify areas to preserve.

- Protect channel migration zone from incompatible land uses through Mason County Critical Areas Ordinances.

- Utilize WRIA 14 culvert inventory to identify fish passage barriers to be replaced.

    - Address WA DOT undersized bridge crossing on Highway 3 (remove riprap and restore stream channel functions).

Additional Priority Habitat Projects & Programs

- Educate landowners located in the Deer Creek Basin to increase compliance with landuse regulations (Critical Areas Ordinances) and voluntary implementation of best management practices.

- Maintain vegetative cover to reduce runoff and erosion that lead to fine sediment deposition.

Goldsborough Creek

Basin	Oakland Bay
Watershed Acreage	38,049 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, cutthroat, and steelhead ► Freshwater: coho, chum, cutthroat, and steelhead
Land Use	Urban and rural residential, commercial forestland
Total Stream Miles	14 miles
Anadromous Stream Miles	14 miles
Current Land Use Regulations	27.8 miles type 1 waters; 5.6 miles type 2; 16.8 type 3; 11.9 type 4; 18.3 type 5; 97.5 type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Fecal coliform
Community Involvement	Increased involvement through dam removal project.

Ownership Pattern

The City of Shelton, Simpson Timber Company and private developers own the lower mile, with Green Diamond Resource Company owning headwaters. There is rural private residential sprinkled throughout the watershed.

Watershed Description

Development has dramatically impacted the lower miles of Goldsborough Creek. The City of Shelton impacts the mouth with stormwater pipes draining to the creek as well as dikes and levees that provide flood control in the lower miles. City stormwater utility pipes cross the creek below ground level near the mouth upstream of the Simpson Timber Company Mill. The creek continually exposes these pipes, requiring frequent instream maintenance by the city.

The headwaters of Goldsborough Creek originate in a wetland complex owned by Green Diamond . Simpson also owns the railroad that crosses the creek several times with bridges at each crossing. This area is also the site of a recent dam removal sponsored by the ACOE, Simpson, Squaxin Island Tribe, WDFW, WDOE, SPSSEG, etc. The former dam produced electricity since the 1940's, preventing fish passage until the installation of a fish ladder in the 1960's. All participants saw the merits in removing the dam and embarked on a project that has installed a series of 36 weirs over the course of 0.5 miles of creek, allow fish passage. The riparian area has been replanted with native vegetation and fish have once again begun passing upstream. Upstream of the site, the creek is in good condition with spawning gravels, rearing at the headwaters, nice pool quality, and a functioning riparian corridor. Coffee Creek is a right bank tributary offering additional rearing habit. The estuary is in poor condition due to its alteration by both the city and the timber company.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Poor	Poor	Good-Poor	Fair	Good-Poor	Fair-Poor	*Poor

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Fair	Good-Fair	Good	Good	Good	Poor	Poor	Fair,2

High Priority Habitat Projects & Programs

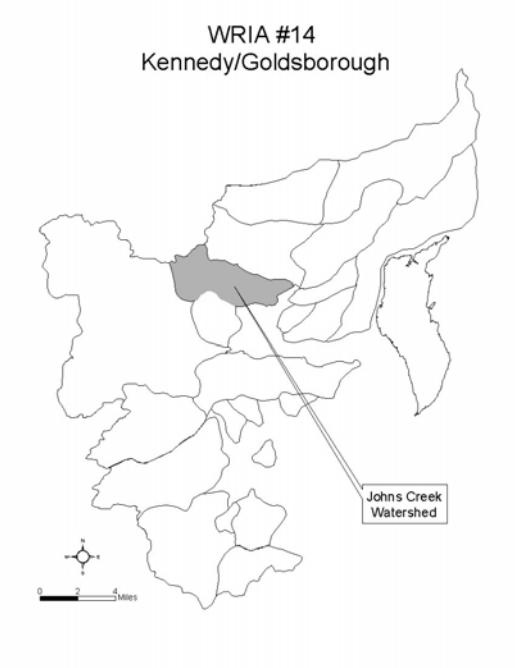
- Restore the Goldsborough Creek estuary. The importance of estuaries for rearing to salmonid species from all areas of Puget Sound is becoming apparent, with each area contributing spatial diversity and opportunities.
    - Develop a feasibility study.
    - Develop an approved design.
    - Implement approved design.
- Preserve essential habitat features that contribute to properly functioning conditions. This area has sparse low-density development in the middle and upper reaches, which provides high potential for protection actions. Conduct an assessment to identify areas to preserve.
- Relocate existing wastewater conveyance infrastructure from stream bottom to reduce the amount of hardening currently needed.
- Implement 'Integrated Streambank Protection Guidelines' (soft armoring using wood/rootwads) especially in lower reach of Goldsborough Creek where current excessive riprap exists. This should also be implemented throughout the basin where warranted.
- Address instream flow issues throughout basin, special emphasis in Winter Creek (refer to WRIA 14Watershed Management Plan).
- Preserve upper watershed wetland complexes and their functions through easements, trusts, and landowner education (North Fork and South Fork Goldsborough).
- Restore wetlands and riparian corridors located in agricultural areas in the North and South Forks of Goldsborough Creeks (correct ditching, riser pipes, etc.).
- Identify and correct areas where livestock have direct access to the North and South Forks of Goldsborough Creek (restore riparian functions in tandem with livestock exclusion).
- Determine feasibility of restoring natural functions to the headwater channel of North Fork Goldsborough Creek. Currently impacts include; ditching, reed canary grass, poor instream flow, and poor riparian conditions.
- Determine feasibility of restoring natural functions through LWD placement and removal of bank hardening structures (tires, riprap, and oil drums) in a tributary channel of the South Fork Goldsborough Creek (DeSilva area – not mapped).

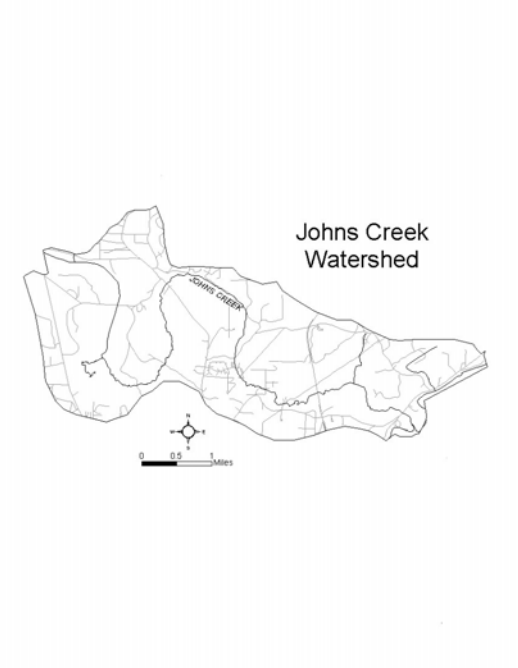
- Outreach and education. Because of the high visibility of the creek, in liaison with the history of former dam site, the creek lends itself to outreach for the entire area. A trail meandering through the restoration site would create an opportunity to educate the general public regarding salmon, the importance of habitat, and ways to become further involved in salmon issues.

Additional Priority Habitat Projects & Programs

- Restore riparian corridor throughout the Goldsborough Creek Basin to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species.
    - Conduct a riparian assessment to identify appropriate locations for riparian restoration actions.
    - Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.
- Educate landowners located in the Goldsborough Creek Basin to increase compliance with landuse regulations (Critical Areas Ordinances) and voluntary implementation of best management practices.
- Investigate freshwater mussel decline and their survival linkage to salmon.
- Utilize WRIA 14 culvert inventory to identify fish passage barriers to be replaced (Anderson Lake man-made impounding structure on the NF Goldsborough).

Johns Creek





Basin	Oakland Bay
Watershed Acreage	7,317 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, steelhead, and cutthroat ► Freshwater: Chinook, coho, chum, steelhead, and cutthroat
Land Use	Rural residential
Total Stream Miles	8.3 miles
Anadromous Stream Miles	8.3 miles
Current Land Use Regulations	13.0 type 1 waters; 3.4 miles type 2; 11.6 miles type 3; 8.3 miles type 4; 0.4 miles type 5; 9.6 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Temperature
Community Involvement	Unknown

Ownership Pattern

The headwaters of Johns Creek are commercially managed forestlands owned by Green Diamond Resource Company. Shellfish are the primary industry in Oakland Bay, which produces 40% of the Nation's Manila clams.

Watershed Description

Much of the natural function exists on John's creek. It is almost entirely comprised of wetlands, with a meandering and difficult to define stream channel. An enormous wetland complex is the headwaters. At RM .5 is a WDFW decommissioned hatchery. Culverts dominate the road crossings, likely passing fish but not allowing for the natural stream function. Much of the riparian corridor includes wetland shrubs, with a functioning overhead canopy in some places. The Squaxin Island Tribe and the WRIA 14 Watershed Planning Unit are conducting a joint study of the temperature in the creek. Also needing further examination are the railroad crossings on the creek since they may be a velocity barrier for adults and juveniles. As Mason County grows, Johns Creek will feel significant development pressures. Currently, prospective developers are preparing studies that examine residential development options.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Poor	Fair	Good	Fair	Good-Poor	Poor	*Fair

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Fair	Poor	Good	Poor	Good-Poor	Poor	Data Gap	FairPoor

High Priority Habitat Projects & Programs

- Assess and restore migration at railroad crossing. These passage issues were identified during a fish passage inventory and need to be further examined.
- Protect headwater wetlands in Johns Creek through Mason County land use regulations (high development pressure).
- Preserve upper watershed wetland complex functions through acquisitions, easements, trusts, etc.
- Restore and preserve riparian corridor to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species (incorporate additional conifer in the lower and middle reaches).

- Conduct a riparian assessment to identify appropriate locations for riparian restoration and protection actions. Protection in the upper watershed (threat of development) and restoration in the lower watershed.

- Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

- Address instream flow issues (refer to Watershed Management Plan)

- Remove derelict instream hatchery structures at approximately RM 0.5.

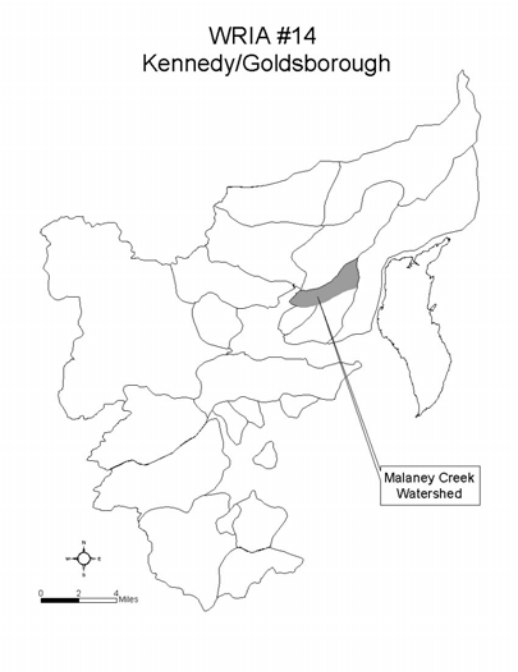
- Investigate implications of lost estuary functions due to diking and dredging.

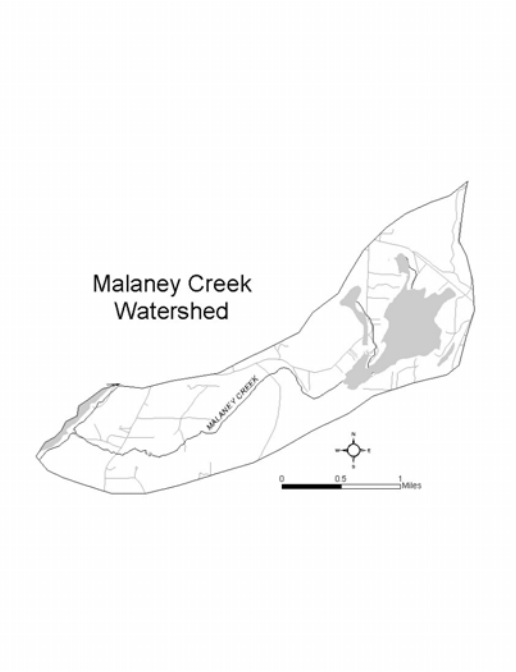
Additional Priority Habitat Projects & Programs

- Investigate pesticide use and compliance at golf course.

- Address gravel mining non-compliance issues for water quality, quantity, mass wasting, and sediment input into John's Creek.

Malaney Creek





Basin	Oakland Bay
Watershed Acreage	2,296 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, cutthroat, and steelhead ► Freshwater: coho, chum, steelhead, and cutthroat
Land Use	Rural residential, agricultural
Total Stream Miles	3 miles
Anadromous Stream Miles	3 miles
Current Land Use Regulations	7.7 miles type 1; 2.8 miles type 3; 3.2 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro-layer
303(d) Listings	Fecal Coliform
Community Involvement	Unknown

Ownership Pattern

The watershed is in private residential ownership.

Watershed Description

Many of the natural processes on Malaney Creek are intact. One landowner owns the functioning mud flat estuary on Oakland Bay. The estuary/mud flat area has been identified as a high priority for conservation through the SRFB funded, Oakland Bay and Hammersley Inlet Nearshore habitat Assessment (Anchor 2002). Cooperative landowners exist throughout the system, making community outreach and biological projects possible. Several residences have bridge crossings, allowing for fish passage. The riparian corridor is primarily deciduous but functioning with LWD and excellent spawning gravels in this gravel dominant system. The headwaters of Malaney Creek begin at Spencer Lake, a dredged wetland lake. WDFW decommissioned a former earthen dam that controlled lake levels. WDFW also plants trout in the lake, which has lead to the incidental by-catch of rearing smolts. At RM 2, a cow fence crossing the creek alters the flow and acts as a debris catcher. At RM 2.5 -3, the stream channel has been degraded and is in need of attention. A recently funded culvert project will remove a total blockage at RM 0.5, remove existing weirs, and install additional pieces of LWD in the summer of 2005.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Poor	Data Gap	Poor	Poor	Fair	Poor	Fair-Poor	Fair	*Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Fair	Good	Good	Data Gap	Good	Data Gap	Data Gap	Poor

High Priority Habitat Projects & Programs

- Improve riparian area. Improve fencing at RM 2 to allow for free flowing debris and address degraded channel at RM 2.5 – 3.

- Preserve mud flat estuary as identified through the Oakland Bay/Hammersley Inlet Nearshore Habitat Assessment, 2002. Work with landowner at the mouth to protect estuary habitat and upstream corridor to approximately RM 0.4 through acquisitions and easements for use by all species of salmonids.

- Implement culvert project to alleviate blockage at RM 0.5 located under Agate Road.

- Upstream of Agate Road restore stream channel, riparian corridor, and man-made impoundment.

Additional Priority Habitat Projects & Programs

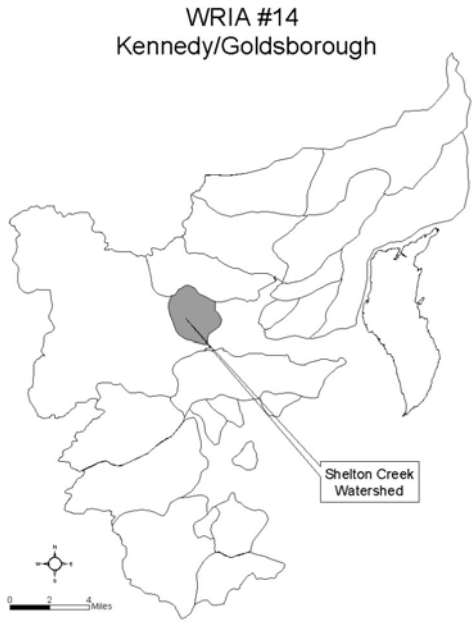
- Educate landowners located in the Malaney Creek Basin to increase compliance with landuse regulations (Critical Areas Ordinances) and voluntary implementation of best management practices.

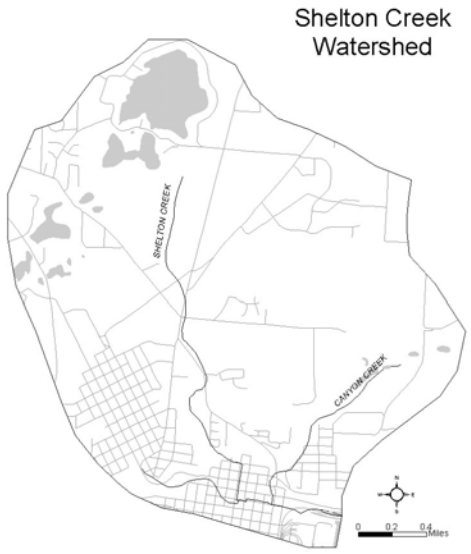
- Restore upper watershed riparian corridor to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species (incorporate additional conifer in the riparian corridor).

    - Conduct a riparian assessment to identify appropriate locations for riparian restoration actions. Preliminary observations have identified areas in the lower reaches for additional conifer plantings.

Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

Shelton Creek





Basin	Oakland Bay
Watershed Acreage	3,391 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, steelhead, coho, chum, and cutthroat ► Freshwater: coho, chum, and cutthroat
Land Use	Urban residential, commercial development
Total Stream Miles	2.6 miles
Anadromous Stream Miles	2.6 miles
Current Land Use Regulations	2.5 miles type 1 waters; 1.8 miles type 2; 1.7 miles type 3; 1.0 miles type 4; 5.0 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Fecal coliform
Community Involvment	Unknown

Ownership Pattern

The City of Shelton owns a majority of the watershed, which is interspersed with private residential land uses. Simpson Timber Company owns the mouth and estuary and operates a plywood mill at the site.

Watershed Description

The City of Shelton and the Simpson mill have dramatically impacted the natural functions of Shelton Creek at its mouth. Stormwater and culverts are the main issue in the creek. An overflow pipe redirects stormwater to Goldsborough Creek during large storm events. Much of the stream in the city is a concrete channel, passing under streets, through the basement of a furniture store, around parking lots, and in the backyards of many homes. There is a stormwater pond located near the headwaters, with trash racks and a dam. Canyon creek joins Shelton creek near the stormwater pond. Flow and groundwater withdrawals are major issues on this stream that has pools of spawning gravels woven through the urbanization.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Poor	Data Gap	Poor	Poor	Poor	Data Gap	Poor	Poor	*Poor

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Poor	Poor	Poor	Data Gap	Data Gap	Poor	Poor	Poor

High Priority Habitat Projects & Programs

- Restore the Shelton Creek estuary. The importance of estuaries for rearing to salmonid species from all areas of Puget Sound is becoming apparent, with each area contributing spatial diversity and opportunities.
    - Develop a feasibility study.
    - Develop an approved design.
    - Implement approved design.
- Education and outreach. Shelton Creek is an urban stream with great potential for educating the general public. Visibility to those living in and around Shelton pass over the creek, most without knowing salmon are spawning below them. A network

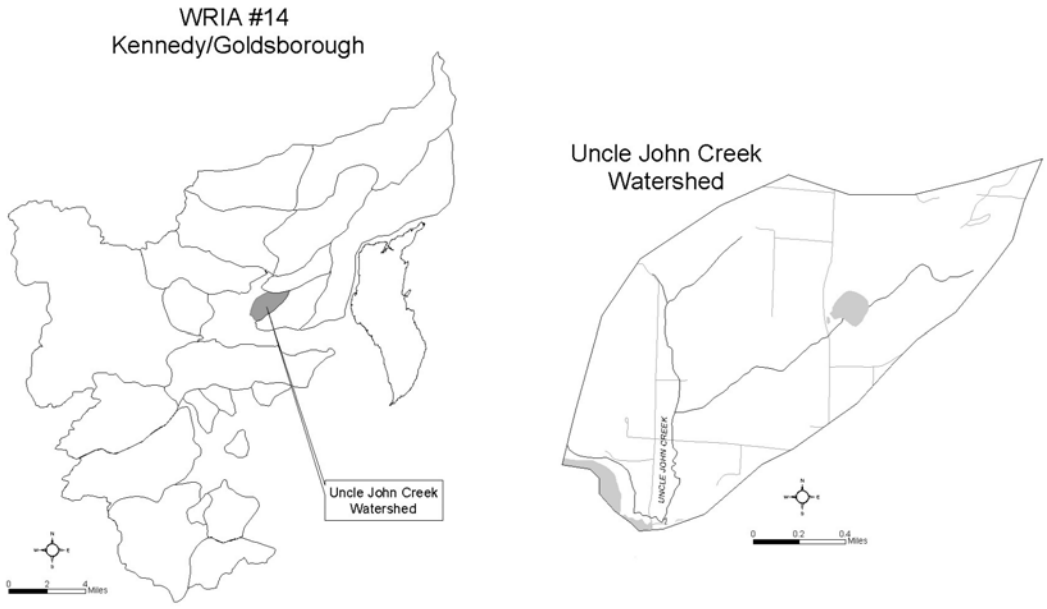
of interpretative signs, benches, and respite spots would offer recreation with an educational component for Mason County residents.

Additional Priority Habitat Projects & Programs

- Restore riparian corridor throughout the Shelton Creek Basin to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species.
    - Conduct a riparian assessment to identify appropriate locations for riparian restoration actions.
    - Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.
- Protect upstream habitat features – headwaters of Shelton Creek.
    - Educate landowners to eliminate refuse dumping into the Shelton Creek Canyon, from stormwater impoundment to headwaters.
- Implement 'Integrated Streambank Protection Guidelines' (soft armoring using wood/rootwads) especially in lower reach of Shelton Creek where currently excessive riprap exists. This should also be implemented throughout the basin where warranted.
- Address City of Shelton stormwater impoundment and flood control.
- Determine impacts and solutions to address instream flow issues throughout the basin due to City of Shelton flood control protocols. (Refer to WRIA 14 Watershed Management Plan).

Explore feasibility of restoring stream and habitat functions while still acknowledging urban development and stormwater infrastructure needs.

Uncle John's Creek



Basin	Oakland Bay
Watershed Acreage	1,118 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, cutthroat, and steelhead ► Freshwater: coho, chum, and cutthroat
Land Use	Rural residential, agriculture
Total Stream Miles	1 mile
Anadromous Stream Miles	1 mile
Current Land Use Regulations	0.6 miles type 1 waters; 0.5 miles type 3; 0.5 miles type 4; 0.4 miles type 5; 2.4 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	Fecal Coliform
Community Involvement	Unknown

Ownership Pattern

The watershed is in private ownership that consists mostly of rural residential uses and hobby farms.

Watershed Description

Human and agricultural practices have impacted Uncle John's Creek. The estuary is functional, with predominating mud flats. A culvert at the estuary on Oakland Bay appears to be passing fish. The creek has little canopy cover and would benefit from the addition of a riparian corridor. A barrier culvert exists at the headwaters, an open water wetland, where ditching of the wetland is also occurring.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Poor	Data Gap	Data Gap	Poor	Poor	Poor	Poor	Poor	*Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Poor	Poor	Fair	Poor	Good-Poor	Data Gap	Data Gap	Data Gap

High Priority Habitat Projects & Programs

- Address blocking culvert and connectivity on headwater wetland located under Agate Road. Re-establish wetland connectivity.

- Restore riparian corridor to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species (incorporate additional conifer in the riparian corridor).

    - Conduct a riparian assessment to identify appropriate locations for riparian restoration actions.

    - Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

- Educate landowners located in the Uncle Johns Creek Basin to increase compliance with Mason County landuse regulations (Critical Areas Ordinances) and voluntary implementation of best management practices.

- Re-establish stream channel along Daniels Road (Mason County ditch).

- Remove man-made pond that accommodates numerous domestic ducks and contributes to high fecal coliform and high water temperatures located on Daniels Road. Restore stream channel and riparian corridor.

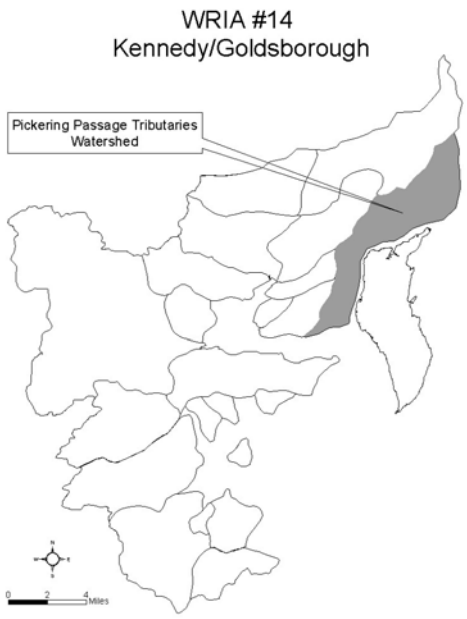
- Improve land use compliance (stop altering stream channels).

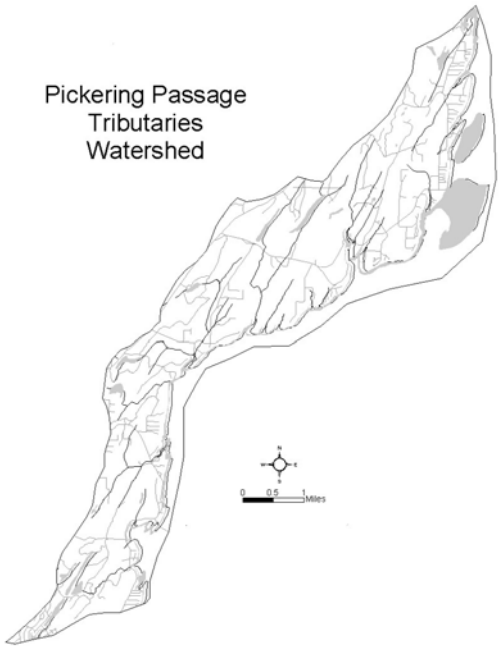
- Maintain vegetative cover to reduce runoff and erosion that lead to fine sediment deposition. Protect stream channel/riparian corridor through private woodlot owners in the middle to upper reaches of the Uncle Johns Creek Basin are in compliance with current regulations (Forest and Fish Rules).

- Identify and correct areas (impacted from mouth to headwaters) where livestock have direct access to Uncle John's Creek (restore riparian functions).

- Correct fish passage barrier at upper Daniels Road crossing.

Pickering Passage Tributaries





Basin	Pickering Passage
Watershed Acreage	13,640 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, sockeye, cutthroat, and steelhead ► Freshwater: coho, chum, and cutthroat
Land Use	Rural residential, commercial timber
Total Stream Miles	3.5 miles
Anadromous Stream Miles	3.5 miles
Current Land Use Regulations	8.7 miles type 2 waters; 12.7 miles type 3; 6.7 miles type 4; 5.9 miles type 5; 30.7 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	None
Community Involvement	Unknown

Ownership Pattern

Both Hiawata and Twilight creeks have limited rural residential development and are largely held in commercial timber. One private landowner owns the estuary on Hiawata Creek and cooperative landowners dot the area.

Watershed Description

Hiawata Creek is a small (1.75 mile) tributary to Pickering Passage. Many of its natural processes have been impacted on some reaches. At RM 0.5, a total barrier culvert impedes adult and juvenile fish passage, where upstream a fishway is passing some fish at some life stages. Between the two man-made structures, WDFW installed a roughened channel to mitigate the effects of the fishway. This alternative has failed and bank erosion is now taking place. The creek forks at RM 1. Timber harvests along the right bank fork have impacted the stream. The left bank fork has its headwaters in a wetland with an intact riparian corridor comprised of numerous conifers in the lower section. The system has good spawning gravel and key pieces of LWD . The estuary is intact and owned by one private landowner.

Twilight Creek is also a small (1.75 mile) tributary to Pickering Passage. The stream has retained much of its historical functions due to limited development and silviculture activities. The headwaters of Twilight creek drain from a 50-acre wetland, with an excellent riparian area and good spawning gravels. A total barrier culvert downstream from the wetland limits the rearing potential for this stream. Cooperative landowners surround the creek. A bridge spans the estuary, allowing for a functioning nearshore environment.

Combined, these streams offer spatial diversity for chum and coho spawning, a respite opportunity for juveniles and a link to a functioning estuary environment.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Data Gap	Data Gap	Data Gap	Poor	Poor	Poor	Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Data Gap	Data Gap	Data Gap	Data Gap	Data Gap	Data Gap	Data Gap	Good

High Priority Habitat Projects & Programs

- Address fish passage barriers on Hiawata creek. A total barrier culvert, failed roughened channel and partially functioning fishway inhibit the use of the available spawning and rearing habitat on this creek.

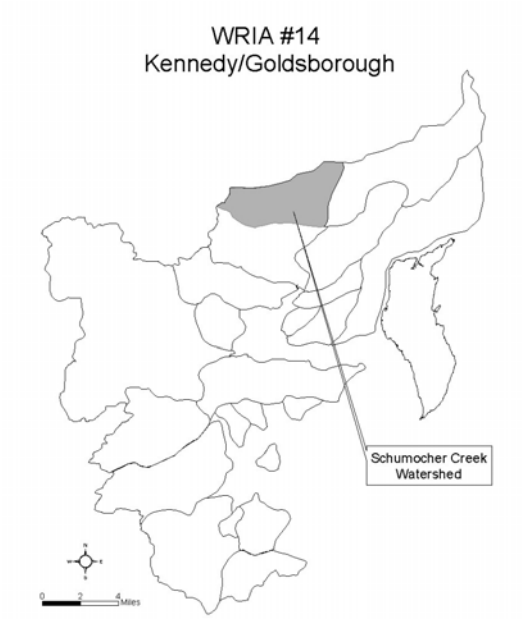
- Correct barrier culvert at the headwaters. The 50-acre wetland offers good rearing potential to over-wintering coho and cutthroat. The correction of this blockage will dramatically increase the amount of off-channel habitat in Pickering Passage.

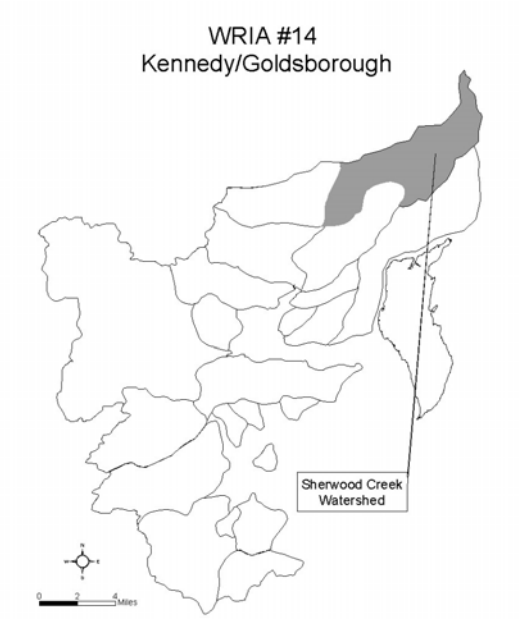
- Preserve tributary estuary on Hiawata and Twilight Creeks.

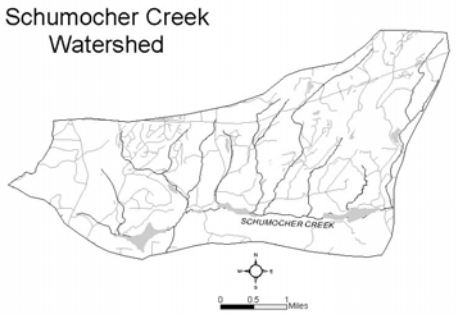
Additional Priority Habitat Projects & Programs

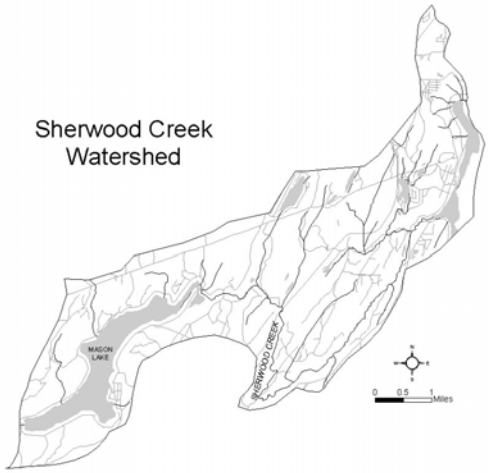
- Pickering Passage: Identify other tributaries and connecting estuaries.

Schumocher-Sherwood Creeks









Basin	Case Inlet
Watershed Acreage	23,217 acres
Anadromous Salmonid Use	► Nearshore: Chinook, bull trout, coho, chum, sockeye, cutthroat, and steelhead ► Freshwater: coho, chum, sockeye, steelhead, and cutthroat; Chinook extend into the freshwater to RM 1.1
Land Use	Residential, commercial forestland
Total Stream Miles	17 miles
Anadromous Stream Miles	17 miles
Current Land Use Regulations	40.1 miles type 1 waters; 2.9 miles type 2; 10.5 miles type 3; 14.9 miles type 4; 15.6 miles type 5; 38.5 miles type 9. Note that stream lengths include pond and lake shorelines that are typed in the DNR hydro layer
303(d) Listings	None
Community Involvement	Allyn Salmon Enhancement Group, Mason Lake Community Association

Ownership Pattern

Heavy residential development exists at the mouth of Sherwood to RM 1 and around the shores of Mason Lake. DNR and Green Diamond Resource Company own much of riparian areas along both creeks and very limited rural residential exists on Schumocher Creek.

Watershed Description

Wetlands that lie at the headwaters of this stream complex evolve into Schumocher Creek. The waters of Schumocher Creek meander seven miles through additional wetlands before depositing into Mason Lake, which is a high temperature, shallow lake with heavy residential development. Sherwood Creek flows from Mason Lake and then drains eight miles into a Case Inlet estuary.

The estuary on Sherwood Creek has a freshwater dike constructed in the 1950's to protect outdated shellfish beds. Heavy residential development dominants the lower mile, with a mill pond at RM 1.1. Hatchery Chinook strays are often present in the reach of the creek. DNR and Green Diamond Resource Company own from the millpond to Mason Lake. A recent SRFB project replaced two impassable culverts at RM 6.5 with a 65 foot precast concrete railroad bridge, allowing migration for all species to areas not accessed for 60 years. A DNR bridge crosses the creek at RM 7.5, where the creek turns predominately to wetlands. Mason County owns Five Pipes, a series of five culverts designed to function similar to a bridge in the hydrophilic soils.

Anderson Lake Creek is a 1.75-mile tributary to Sherwood Creek at RM 0.5. An impassable perched culvert was replaced on Anderson Lake Creek near the confluence with Sherwood with a new box culvert with streambed material distributed throughout. This tributary offers good spawning and rearing habitat, with excellent gravels and numerous pieces of LWD.

Man-made and beaver dams located at the outlet regulate the water levels of Mason Lake. The lake is also being treated for milfoil and predator species have been found in the lake.

Schumocher Creek has wetlands throughout and wetland headwaters, with a newly constructed Mason County bridge at RM 0.2, replacing a blown-out culvert Little development exists along this creek offering good rearing habitat for Coho and cutthroat. Simpson Timber Company owns the mouth of Schumocher Creek and has developed an employee park on the shoreline of the lake. The stream channel starting at the mouth of the creek, through the park has no riparian buffer and has been impacted from road crossings and other non-compatible land use activities. An active community association conducts spawner surveys on Schumocher and Sherwood creeks and operates several remote site incubators (RSI) throughout the system.

Assessment Overview of Watershed Natural Processes

Fish Passage	Riparian Condition	Riparian Canopy Closure	Streambank Condition	Floodplain Connectivity	Substrate Embed.	LWD Total	LWD Key Pieces	Estuary Connectivity
Fair	Data Gap	Data Gap	Fair	Fair	Data Gap	Good	Good	*Good

Pool Frequency	Pool Quality	Off-Channel Habitat	Water Quality		Water Quantity/ Dewatering	Change in Flow Regime	Biological Processes
			Temperature	Dissolved Oxygen			
Poor	Data Gap	Good	Poor	Good	Good,2	Data Gap	Fair

High Priority Habitat Projects & Programs

- Investigate options for the mouth of Sherwood. The natural meander of the fresh and saltwater mixing has been impeded by the existence of the dike on the estuary. Removal would allow the mouth to create natural braiding system benefiting all species utilizing the estuary system.

- In the lower mile of Sherwood, protect channel migration zone from incompatible land uses through Mason County Critical Areas Ordinance regulations.

- Restore riparian corridor to provide shade, stabilize streambanks and recruit LWD. Plant appropriate species (incorporate additional conifer in the riparian corridor).

- Conduct a riparian assessment to identify appropriate locations for riparian restoration actions.

- Increase LWD key piece abundance to encourage pool formation and sorting of sediments. Develop a strategy to place instream LWD for immediate benefits until riparian conditions improve to allow natural recruitment.

- Protect and restore headwater wetlands through Mason County land use regulations

- Explore opportunities to maintain headwaters in commercial forestry.

- Restore Green Diamond / Simpson Timber Company recreation area stream reach on Schumocher Creek (stream corridor restoration and protection, LWD, riparian plantings)

Additional Priority Habitat Projects & Programs

- Determine feasibility of correcting partial fish passage barrier at the outlet of Mason Lake (Five Pipes)

- Determine feasibility to correct impoundment structure at the outlet of Trask Lake (Impoundment structure effects on fish passage and instream flows).

- Identify and correct improper land uses along Trask and Mason Lakes through Mason County Critical Areas Ordinances regulations.

- Address exotic fish issues (bass)

- Chapter Five -

Community Issues and Concerns

Although a salmon habitat protection and restoration project or program must pass a review regarding its technical merits, simultaneously it must deal with community issues and concerns in an effective and appropriate manner. To this end, Chapter Five inventories these community issues and concerns as well as provides guidance as to developing and prioritizing project lists from this standpoint.

Providing Effective Education

The one community issue and concern that clearly leads the way above all others is the need for more effective education, especially of riparian property owners. There is a breadth of misinformation in the community about the needs of salmon, who benefits by habitat protection and recovery efforts, and how best to help. The community's lack of knowledge on these issues often surface as:

- No commitment in habitat protection and recovery efforts
- Avoidance in accepting that we can do something about habitat problems
- Looking for easy fixes (hatcheries)
- Hostility against specific groups of people

The LE encourages and supports projects that have the opportunity to incorporate an educational element to some extent, whether it be active or indirect. These opportunities are important to share information to the community about why salmon habitat protection and restoration is crucial.

Actions incorporated into projects that provide opportunities for more effective education are:

- Publicizing good stewardship practices and actions
- Getting the word out about salmon habitat recovery and restoration efforts through a website, educational signs, radio ads, written information distributed in high traffic areas, public access TV shows, and interpretive trails
- Giving presentations before community groups during and after completion of projects

Promoting Stewardship and Strong Partnerships

The most frequent positive question we receive from the community is “What can I do to help?” We need to be prepared to bring about this willingness to help into constructive action.

Projects can facilitate good stewardship and strong partnerships through educational efforts as well as by

- Engaging community volunteers in revegetation and salmon monitoring projects
- Soliciting corporate sponsorships – especially with large landowners
- Soliciting partnerships with private communities with critical habitat or open space
- Giving presentations before sportsmen’s clubs to promote collective or individual project ideas
- Briefing editorial boards on current projects
- Having native plant give-a-ways

Addressing Perceived Threats to Private Property Rights

We cannot ignore the fact that salmon share their habitat with people on privately owned lands. Many landowners show great anxiety about getting involved in protection and restoration efforts due to their anxiety about losing private property rights, including their long-term financial investment.

That is why using approaches that convey the message that preserving or restoring salmon habitat is not synonymous with taking away private property rights. Project and programs can do this by

- Having clear agreements with landowners before entering property
- Educating communities about how salmon habitat protection and restoration can coexist with long-term protection of property
- Promoting landowner friendly methods, such as conservation
- Sharing information with landowners and the public about private property rights
- Ensuring funding outreach efforts with landowners

Spending Money Wisely

The big, pointed question that the public often asks is whether we are spending public tax dollars wisely. Are we really making a difference? Our projects and programs need to prove and communicate to the public that we indeed are spending their money to good and effective purpose.

We can accomplish this by designing and implementing projects and programs that

- Have a high benefit to cost ratio
- Take the most cost efficient approach possible
- Ensure the completion of each project or program is within the established budget
- Has commitment for the necessary follow-through to bring about a successful completion
- Gives progress reports back to the community

Communicating Effectiveness

People demand that we prove that preserving and restoring salmon habitat will bring more fish.

We can do this over time through effectively monitoring of projects during and after their implementation. Projects will

- Adopt Salmon Recovery Funding Board guidance on monitoring
- Educate the public that fixing the habitat does not bring fish back by itself. Many other factors impact fish returns (e.g., hatcheries, harvest, ocean conditions)
- Communicate the results of monitoring efforts to project sponsors, the Lead Entity, and the citizens
- Incorporate past monitoring findings to improve proposed project approaches

Pointing Out the Public Cost from Private Benefit

Continued development within critical areas and the continued fragmentation of lands into smaller private parcels may prove disastrous for long-term efforts aimed at salmonid habitat protection and restoration.

Public awareness needs to address the following:

- The public loss of salmon is a private loss – we lose a very special part of our Northwest quality of life
- We need to change public perceptions of private property rights versus the public good
- An increase in regulations on public lands can protect public resources
- There are incentives available for property owners to conserve, such as Open Space Tax program and land trusts
- We need to acquire key habitat to protect salmon resources into the future
- Environmentally-conscious development is possible

Sharing the cost

The burden of "who pays" for salmon habitat protection and restoration is a matter of frequent debate. Increased taxes on property owners, loss of useable land via protection measures (i.e. buffers), and lost jobs are reasons frequently stated for not doing salmon projects and programs.

We can find new ways to distribute the load more evenly across the community. Here are some sample approaches

- Research alternative match requirements for projects requiring "match"
- Educate communities concerning cost effectiveness of protection versus restoring habitat functions
- Recognize outstanding stewardship
- Increase awareness about open space tax and easement programs
- Research compensation to landowners for preserving key habitat not protected by regulations
- Target conservation futures to fund priority projects

Overcome a cumbersome bureaucracy

The lightning rod of salmon habitat protection and restoration is the bewildering realm of government processes, regulations, and permitting, even for projects that benefit salmon. Cumbersome bureaucracy sours everyone's attitude and makes the job of salmon recovery more difficult to bring about.

Projects that "ease" sponsor anxieties about bureaucracy are important.

An important facet of any good projects is to have the right people available to give assistance to landowners or sponsors during permitting processes.

But we need to examine and change how the system itself works – its complexities make it a challenge just to get people involved in the first place. Here is a list of some of the most needed systematic improvements:

- Most grants require match; it is expecting a lot to find sponsors who are willing to both share their land and come up with a match. Research alternate funding sources.
- Expand the amount of time allowed to complete a project with SRF Board funding.
- Consolidate or waive individual permits for salmon habitat restoration projects.
- Have consistent permit applications, timelines, and review requirements among local, state, and federal agencies.
- Permit agencies need to provide better upfront feedback to project sponsors about application times and requirements. Project planners need to work with sponsors to provide better direction towards success.

- Chapter Six -

Guiding Principles for Project and Program Development, Evaluation, and Ranking

The WRIA 14 Lead Entity Technical Committee adopted a series of guiding principles for evaluating and ranking projects and programs for inclusion on Habitat Project Lists, which it submits to the Salmon Recovery Funding (SRF) Board for potential funding. These guiding principles are also useful in evaluating applications to other grant funding programs that require the endorsement of the Lead Entity.

Potential project sponsors looking to design effective projects consistent with the Salmon Habitat Protection and Restoration Plan for WRIA 14 can also find this chapter helpful.

The guiding principles that follow below blend the integration of science-based protection and recovery priorities with community values. While it is not necessary for all projects to display every one of these principles, each will play a consideration within a formal ranking process.

The project or program must be scientifically sound.

The single, overarching attribute of any project or program seeking endorsement from the WRIA 14Lead Entity is that it must be scientifically sound. Projects and programs must use the best available science and incorporate accepted best management practices.

The project or program addresses habitat needs in sequential order.

The project must be consistent with the High Priority Habitat Projects & Programs for the appropriate subbasin. Consistency with these lists ensures that projects or programs provide the highest benefit to fish in a logical, sequential manner. Projects or programs to be included on Habitat Project Lists must be consistent with the 2004 High Priority Actions.

The project or program achieves optimum cost benefit.

Resources are limited and competition with other WRIAs for funding is high. Therefore, projects must demonstrate a reasonable cost/benefit ratio and be within scale with other projects proposed within the WRIA 14.

The project or program protects or restores natural stream functions.

Protection

Protection effort in WRIA 14 will focus on areas of functional habitat that have a high threat of development or land use changes that will deleteriously impact and/or have the potential to lead to aquatic habitat degradation. Protection projects will conserve critical aquatic habitats and/or landscape features that directly influence the natural processes within a watershed/marine shoreline. These efforts will also target key habitat[rri4] that provides the most benefit to salmonids. Restoration of vital habitat functions may also be a component of a protection project.

Restoration

Restoration efforts in WRIA 14 will focus to restore the natural watershed functions. These efforts will take place in the freshwater watersheds and marine shorelines where it is most attainable to restore successfully the natural processes to benefit salmonids.

Potential restoration areas within WRIA 14 will include those watersheds systems that have a greater potential to restore habitat functions. Subbasins and marine shorelines having restoration potential must incorporate habitat functions for all life history phases, which include spawning, rearing, and migration. Restoration efforts will address the problems impacting the natural processes rather than their symptoms. Logical project sequencing will also be implemented to maximize project benefit (resource/financial) and not negate previously implemented projects.

Although "imperviousness" is a poor indicator of "stream health", there is some relationship between the function of natural ecosystem processes and urbanization. Stormwater treatment and surface water management are the two largest concerns within urban watersheds because of their harmful affects on freshwater and marine habitats.

Streams supporting urban development may have irreparably impaired natural processes. Altered stream hydrology from existing impervious areas, developed buffers, channel modification are a few of the conditions that are found impacting WRIA 14 urban streams. These streams, however, by virtue of their proximity to neighborhoods, offer good opportunities to involve and educate the public on the importance of salmon protection. While restoration actions may not fully restore natural processes, enhancement and protection of existing conditions is possible. Stormwater management is a priority action for these subbasins. However, the WRIA 14 Lead Entity usually does not consider urban streams an appropriate focus area for restoration projects.

The project or program considers all stocks and life stages.

While WRIA 14 gives strong consideration to projects that benefit salmonids listed under the Endangered Species Act and those ranked as critical or depressed under SaSI, it remains committed to its vision of a multi-species approach.

WRIA preference extends to projects and programs that benefit all stocks within a subbasin or the nearshore rather than a single one. Likewise, all life stages remain equal in importance.

The project or program increases the potential for natural productivity.

The long-term health of salmonids in WRIA 14 depends on self-sustaining salmon reproducing at sustainable levels. Ultimately, successful projects must provide a direct or indirect link to an increase in salmon numbers.

The project or program has the potential for long-term success.

Projects and programs must demonstrate a certainty of success by relying on proven best available science and best management practices in their design and implementation.

There must also be a clear commitment towards monitoring and maintenance of a project or program to guarantee long-term duration of the benefit to salmonids.

Adaptive management entails relying on scientific methods to test the results of a project or program so that adjustments can happen appropriately to provide the greatest opportunity for project success. Good projects and programs employ a strong adaptive management approach within its design, along with the capacity to accommodate the need for change when necessary.

The project or program addresses priority data gaps.

The limiting factors analysis clearly communicates the breadth of information still missing about existing conditions in WRIA 14 subbasins. This prevents biologists and communities alike from making the best decisions that adequately address the habitat needs in a logical, prescriptive, and efficient manner.

WRIA 14 encourages projects and programs that address information gaps identified as “High Priority Projects and Programs” within individual subbasins.

The project or program capitalizes on site-specific opportunities.

Habitat Project Lists submitted for SRF Board review and funding normally reflect the High Priority Projects and Programs. However, there are times when the exception to this rule makes sense for the WRIA as a whole.

The WRIA will endorse high priority projects within a subbasin that does not make the High Priority Projects and Programs when an "opportunistic" event arises. However, the opportunistic event must still be scientifically sound and approved by the Technical Advisory Group and Citizen Advisory Committee for submittal to the SRFB.

- Chapter Seven -

Salmon Recovery Funding Board Evaluation and Ranking Process

Purpose

Funding for a project is awarded on a competitive basis by the state Salmon Recovery Funding Board (SRFB). Mason Conservation District is the Lead Entity (LE) for WRIA 14, Kennedy/Goldsborough. The LE encompasses the southwest terminus of Puget Sound, including the saltwater inlets of Totten/Little Skookum, Hammersley, portions of Eld and Case, in addition to Oakland Bay and Pickering Passage, and the freshwater streams that drain to them. WRIA 14 is contained primarily within Mason County, with a small portion in Thurston County to the south. Applicants submit project proposals by to the Lead Entity, which evaluates the proposals, offers suggestions to strengthen the projects, ranks them according to the local salmon habitat recovery strategic plan, and submits a list of proposals to submit to the SRFB for funding consideration.

A committee of citizens, with the assistance of a Technical Advisory Group (TAG), evaluates and ranks projects proposed to the Lead Entity. The TAG evaluates projects based on their technical merits, with an emphasis on the project's benefits to salmon and certainty of success as provided in this plan. The citizen's committee works with the TAG to determine the final ranking of the projects based upon their technical merits in addition to how well the project fits within the Salmon Habitat Restoration and Protection Plan for WRIA 14, public involvement, and cost appropriateness. The lead entity then compiles the entire list of proposals in ranked order and submits them with lead entity details as one package to the SRFB for funding consideration.

Process Steps for 5th Round (All meetings are open to the public)

All applicants must submit their applications through the WRIA 14 Lead Entity. As a continuation from last year, all applicants will submit and modify their grant applications on-line through PRISM, a grant management tool provided by the SRFB. SRFB staff and the Lead Entity Coordinator will provide guidance for PRISM use. Further information on registering to use PRISM and to view the applications can be obtained by contacting the LE Coordinator.

2004 SRFB 5th Round Grant Cycle – WRIA 14 Timeline

Step 1:	April 2	Letter of Intent Due to LE (attached)
Step 2:	April 6	Application Workshop
Step 3:	May 14	First Rough Draft Application Due to LE
Step 4:	May 20	Sponsors Meet with TAG to Review Proposals
Step 5:	June 4	Second Rough Draft of Application Due to LE
Step 6:	June 8	SRFB Technical Advisors Meet with Sponsors and LE
Step 7:	June 8	Field Trip to Project Sites
Step 8:	June 17	Project Presentations to LE
Step 9:	June 17	Sponsors Meet with TAG to Review Proposals
Step 10:	June 18	Final Applications Due to LE
Step 11:	June 30	TAG Ranks Proposals
Step 12:	July 7	Citizen's Committee Ranks and Finalizes Project List
Step 13:	July 16	LE Application Packet Due to SRFB

Step 1: Letter of Intent

This brief one-page synopsis allows the project sponsor to share details of a proposed project with the LE. It includes project title, location, a brief description of intended actions, salmonid species effected and an approximate cost estimate.

Due Date: April 2, 2004

Step 2: Application Workshop

SRFB staff along with the LE Coordinator will provide application manuals, timelines for state and local processes, identify specific sources for technical assistance, and conduct a question and answer session. Also included will be a training on the grant management tool PRISM. This program will be used to

submit applications to the LE and finally to the SRFB. Those interested in becoming project sponsors are highly encouraged to attend. Others in attendance include members of the citizen's and technical committees.

Workshop Location and Date: April 6, 2004, 1:00-4:00pm Olympia Community Center

Step 3: First Rough Draft Application Due to LE

Project sponsors are asked to input all revelant project information into the PRISM database for review and comment by the TAG by this date. Training for use of this computer program will be provided at the above referenced application workshop. The LE Coordinator will assist sponsors having difficulty with the database upon request.

Due Date: May 14, 2004

Step 4: Sponsors Meet with TAG to Review Proposals

This step allows for a dialogue to occur between the TAG and the project sponsor. The TAG will give suggestions for project improvements and modifications during this meeting. The approach is collegial, with all participants working towards the creation of the most beneficial project for salmon. Suggestions will be captured during the meeting on a feedback form that will be available to the sponsor within one working day. Projects that are determined to have a low benefit or low certainty as defined in attachment x, will be informed at the completion of the meeting and given suggestions for action. The goal of the meeting is to educate the TAG members as to the nature of the project and to provide project applicants with constructive verbal and written evaluations. Examples of feedback could be:

Example 1: Culvert design should be improved to pass all species of fish at all life stages.

Example 2: Additional community outreach and educational components could be improved by involving local elementary school students in the plantings.

Meeting Date and Location: May 20, 2004 Mason Conservation District Board Room

Step 5: Second Rough Draft of Application Due to LE

Project sponsors are asked to incorporate any suggested changes or additions to their proposed projects given at the first review meeting at this time. All changes will be made in the PRISM database. The LE Coordinator will assist sponsors having difficulty with the database upon request.

Due Date: June 4, 2004

Step 6: SRFB Technical Advisors Meet with Sponsors and LE

The SRFB Technical Advisors will be traveling to the LE to meet with the Committee and project sponsors. This is the opportunity for the LE and the project sponsors to conduct site visits and gather valuable insight and suggestions from those with expertise based upon the project types being visited. The Technical Advisors will also identify issues of concern regarding the technical soundness of the proposed projects early in the process to allow time to remedy them. The Technical Advisors will provide written comments following the visit.

Date: TBD by SRFB staff, LE and project sponsors

Step 7: Field Trip to Project Sites

It is the intent of the LE to conduct site visits to every project proposed. Where scheduling permits, these site visits will be done in tandem with all representatives of the LE in addition to the Technical Advisors working with the SRFB. Project specifics will be presented by the sponsors on site and suggestions will be given by all participants present. The dialogue created in this setting is aims to increase the benefit and certainty of the project. The exact date will be determined in mid-April to coordinate with LE committee members and availability of the Technical Advisors.

Date: June 7-11, 2004. Exact date TBD by LE, SRFB Technical Advisors and project sponsors.

Step 8: Project Presentations to LE

Project sponsors are asked to prepare a presentation for the LE outlining the details of their proposed project. A time limit for each presentation will be announced along with a schedule, both of which will depend upon the number of applications received. Applicants should include project details, cost estimate, maps depicting project area and orientation, and photos of the site. Time will be allotted to allow for a question and answer session for each project proposed.

The purpose of this presentation is to acquant the LE with the sponsor and the project's intent. All dialogue exchanges will strive for clarity and work towards strengthening the overall benefits of the project

Date: June 17, 2004

Step 9: Sponsors Meet with TAG to Review Proposals

This second meeting with the TAG allows project sponsors to further discuss their proposals and ensure all necessary changes and additions have been incorporated into their draft. Any additional questions will be answered at this time. This is the final opportunity for the project sponsor to make changes to their proposals before they are submitted and ranked. The sponsor will be made aware of any concerns the TAG has at this time. It is the purpose of this meeting to further the collegial exchange between sponsors and LE members and every effort will be made to help the sponsor improve their proposal.

Date: June 17, 2004

Step 10: Final Applications Due to LE

Final versions of the project proposals are to be submitted into PRISM by this date. The LE Coordinator will assist sponsors having difficulty with the database upon request. Additional written materials such as maps or diagrams must be submitted to the LE Coordinator at this time. Project applications will be downloaded from the PRISM database on June 21, 2004 for distribution to the LE Committees.

Date: June 18, 2004

Step 11: TAG Ranks Proposals

The TAG will meet in a cooperative workshop style format to discuss and rate the overall merits of each project. The TAG will rate each project as high, medium or low for the following factors:

- Benefits to Salmon
- Certainty of Success
- Consistency with Strategic Plan
- Cost / Benefit

The goal of this discussion is to come to a consensus on the various merits of each project. This holistic approach will incorporate a full discussion of each project, the outcome of which will outline the ranking rational for each proposal. At the completion of this meeting, the TAG will recommend a ranked list of projects to the Citizens Committee based upon the technical merits of each project.

Date: June 30, 2004 Mason Conservation District Board Room

Step 12: Citizen's Committee Ranks and Finalizes Project List

This meeting will be a combined meeting of the Citizen and Technical Committees. It is the role of the Citizen's Committee to rank each proposal on the basis of:

- Education and Outreach
- Partnerships
- Consistency with Strategic Plan
- Cost / Benefit

The TAG will present their project rankings at this time. They will discuss their rationale and the linkage each project possesses with the strategy. An open dialogue will occur, with questions and discussion from all aspects. The Citizen Committee may choose to accept the rankings as presented from the TAG or re-rank the proposals based upon their elements of focus: education and outreach; partnerships; etc. A consensus of ranking between all members of the LE is the intent of this exchange. If a consensus cannot be reached, a vote will be taken in accordance with the WRIA 14 Salmon Habitat Recovery Committee Policy and Procedure manual. Any consenting votes will be noted and passed along with the final ranking to the SRFB. Sponsors will be notified of the outcome of this meeting within one business day.

Step 13: LE Application Packet Due to SRFB

The LE Coordinator incorporate the final prioritized list of projects into an application packet to submit to SRFB. The packet will include the Strategic Plan for WRIA's 13 & 14, the prioritized list of projects, the ranking criteria, and the LE summary questions as requested by the SRFB.

Date: July 16, 2004

A period of review will follow for the SRFB, which will include Lead Entity presentations, reports and public comment period. The SRFB will allocate funding at their open public meeting December 2-3, 2004.

- Appendix A -

Nearshore Excerpts from the draft Chinook and Bull Trout Recovery Approach for the South Puget Sound Nearshore

General Restoration Approaches for Restoring Properly Functioning Nearshore Conditions

Stressor	Recommendations
Shoreline Armoring	▶ Removing armoring from public access sites – City, County and State Parks often contain waterfront recreation areas with unnecessary armoring. Removal of these structures and restoring native vegetation can account for actual restoration of processes because of their relatively large size and provide perfect example sites for education purposes. ▶ Identify and remove bulkheads not needed for protecting structures ▶ Avoid the necessity of shoreline armoring by requiring setbacks and buffers ▶ When feasible use soft shore protection measures to protect shorelines - Much of the bulkheading that has occurred in South Puget Sound is unnecessary, and in many cases has actually increased shoreline erosion. When bulkeading is required, soft shore alternatives that mimic natural processes, using gravel, sand, logs and root masses, should be used.
Overwater Structures	▶ Institute a No Net Gain in armoring per drift cell – Local governments updating shoreline master programs and GMA critical areas ordinances can adopt a standard to protect existing shoreline function by placing moratoria on new armoring or collecting a resource impact fee for each armoring permit to help defray the cost of bulkhead removal and other nearshore restoration projects. ▶ Formalize design criteria in Overwater Structures white paper – The Aquatic Habitat Guidelines Project developed a white paper with useful design criteria to prevent and minimize damage to nearshore environments. These criteria should be formally adopted in a public rule-making process for WDFW's Hydraulic Project Approval permit program, Corps of Engineers' Section 10 permits and other appropriate permits. ▶ Design overwater structures to let light through, to allow survival of subtidal/ intertidal vegetation. ▶ Remove old homes, floats, debris, old piling, anchors, and derelict vessels. ▶ Minimize the number of docks by encouraging community facilities.
Ramps	▶ Minimize the number of ramps by encouraging community facilities. ▶ Provide incentives to residential property owners to give up individual ramps and marine railways. ▶ Identify and remove boat ramps that cloak sediment transport.
Stormwater & Wastewater	▶ Retrofit stormwater systems using Low Impact Development practices – Many urban areas could be retrofitted using LID principles to improve water retention, treatment and infiltration to the water table, especially as part of ongoing redevelopment projects. ▶ Retrofit wastewater treatment plants for reclaimed water re-use – Wastewater that is currently being discharged into south Puget Sound can be treated to higher standards and used for irrigation, fire suppression and wildlife habitat enhancement similar to Yelm's State of the Art system.

Stressor	Recommendations
Stormwater & Wastewater (Continued)	▶ Promote land use practices that prevent stormwater flows- Development reduces the natural storage and buffering capacity of watersheds, resulting in greater stormwater runoff and a range of negative impacts to aquatic habitats. Where feasible, stormwater runoff should be prevented by preserving native land cover and natural drainage systems (forests, soils, wetlands, shorelines, stream corridors) and limiting the area and connectivity of impervious surfaces. ▶ Implement Comprehensive Stormwater Programs - Element SW 1.2 of the 2000 Puget Sound Water Quality Management Plan calls on all cities and counties to adopt comprehensive stormwater programs to manage stormwater runoff. ▶ Include Nutrient Removal in On-Site Sewage System Design - Nutrient loadings to south Puget Sound are a significant water quality concern (see for example, WDOE 2002 at http://www.ecy.wa.gov/pubs/0203021.pdf). Nutrient sources include discharges from sewage treatment systems. In the Puget Sound region, on-site sewage systems are designed to meet bacteria standards to protect public health, but do little to remove nutrients. Systems installed in shoreline and riparian areas of south Puget Sound should be designed to reduce nitrogen concentrations as well. ▶ Improve Monitoring and Maintenance of On-Site Sewage Systems - In order for sewage systems to function effectively they must be properly sited, designed, installed, operated, monitored and maintained. Element OS-2 of the 2000 Puget Sound Water Quality Management Plan calls on local health jurisdictions to adopt programs that provide for regular monitoring/maintenance of on-site systems and follow-up action to ensure that malfunctioning and failing systems are repaired or replaced. The plan further calls on local health jurisdictions to identify areas of special concern and use risk-based approaches to provide enhanced oversight in marine shoreline areas and other sensitive environments. ▶ Promote or Require Wastewater Reuse - Municipalities and other dischargers should explore opportunities to recycle and reuse treated wastewater to reduce nutrient loadings to marine waters and to supplement and replenish limited freshwater supplies. ▶ Prohibit New Wastewater Discharges to Puget Sound - Water quality studies indicate that wastewater discharges are contributing to the eutrophication of marine waters in south Sound. Element P-2.1 of the 2000 Puget Sound Water Quality Management Plan calls on Ecology to pursue alternatives to marine wastewater discharges “whenever such alternatives are feasible, economically achievable and environmentally preferable. . . . Alternatives to be considered shall include, but not necessarily be limited to, the following: land application, reuse, additional treatment and the use of constructed wetlands.” ▶ Reduce Nutrient Loadings from Permitted Wastewater Facilities - State and federal law and the 2000 Puget Sound Water Quality Management Plan call on Ecology to set water quality and sediment standards, to implement anti-degradation requirements, to incorporate conditions from Total Maximum Daily Load studies, and to issue NPDES permits to meet and implement these requirements. Increased nitrogen loadings and related problems with dissolved oxygen have been identified in many areas of south Puget Sound.

Stressor	Recommendations
Stormwater & Wastewater (Continued)	▶ Systematically reduce human-caused nutrient sources. Ecology marine monitoring data and studies have found the South Sound waters are susceptible to low dissolved oxygen conditions that can be caused by increased nutrients. A focused effort, South Puget Sound wide is needed to prevent human-associated nutrients from entering the South Sound. ▶ Implement a comprehensive street sweeping program to reduce the amount of pollution in water runoff - Roads, highways and bridges are sources of pollution such as sediment, heavy metals, oil, grease and debris. A significant amount of these pollutants are carried to Puget Sound by storm water when it rains. New technology in street sweeping equipment considerably reduces the amount of pollution found in runoff water
Landfill below the HHWL	▶ Prohibit any new fill for any use or structure ▶ Remove fill and structures below the high high water line
Riparian Loss	▶ Require native plantings along shoreline as a permit condition – Most bulkheads, overwater structures and other appurtenances require a local building permit and several state or federal use permits. These permits should require the planting of native vegetation, even for renewal permits, so that a marine riparian area can eventually re-establish. There are a number of guidance materials available for maintaining views and access while retaining native vegetation along the shoreline. ▶ Establish building setbacks that are protective of shoreline forests and other natural habitats, or allow the restoration of these habitats. Shoreline forests and other natural habitats provide important functions such as inputs of salmonid prey species and wood. Encroachment into these natural areas and forests leads to extensive physical/chemical, and habitat effects and impacts on salmonid populations. ▶ Require riparian buffers along the nearshore as a permit condition - The importance of riparian buffers for salmon and trout in freshwater systems has long been recognized. Placing buffers along the marine nearshore would serve a similar purpose. ▶ Increase public ownership along the shoreline to protect riparian habitat. ▶ Designate shorelines as open space areas.
Wetland & Estuarine Modification	▶ Encourage dike and tide gate removal, and improve agricultural practices on marine and estuarine marshes. In the past, substantial loss of estuarine and tidally influenced wetlands was due to the diking and hydrologic isolation of the wetlands, primarily for agricultural purposes. Dike removal and restrictions on agricultural use of estuarine wetlands (fencing of cattle, etc.) would restore important estuarine functions. This can be accomplished through incentives and buy-back programs, some of which currently exist at the federal level, such as the Conservation Reserve Program and the Wetland Reserve Program through the Natural Resources Conservation Service. Similar state and local programs could also be created and targeted toward wetland/estuarine restoration.

Stressor	Recommendations
Wetland & Estuarine Modification (Continued)	▶ Increase funding for estuarine restoration and monitoring – Most funding sources for restoration are capped at $5 million or less and require enormous resources on the part of local partnerships to find match. Restoring natural processes generally occurs at a larger geographic scale than structural restoration projects and may contain elements that are experimental until implemented and monitored. These funding sources also limit the amount of the grant that can be spent on monitoring and adaptive management, so little is known as to the success of these projects. Increasing state and federal appropriations for restoration at larger scales and actively investing in effectiveness monitoring would improve restoration effectiveness. ▶ Remove shoreline armor and bulkheads around the mouths of tributaries. ▶ Remove blockages to small tributaries, such as culverts, fill, and structures
Input of Toxic Components	▶ Public education re Best Management Practices (BMPs) for preventing entry of toxic contaminants into nearshore and marine waters. For many years the ocean and inland marine waters were generally considered safe from harm by human actions. This is no longer the case; South Puget Sound nearshore and marine waters now have extensive contamination that can cause a broad suite of negative effects to salmonid populations. ▶ Ban the use of PBDEs - PBDEs (polybrominated diphenyl ethers) are persistent, bio-accumulating toxics used as flame-retardants in mattresses, carpets, etc. They have a structure similar to PCBs (polychlorinated biphenols), appear to behave similarly, and they are increasing in the environment in North America. ▶ Clean up Puget Sound toxic sediments, including South and Central Puget Sound. The removal of sediments is preferable to capping. ▶ Pesticides – Educate the public about the problems related to pesticide use and provide stream buffers to help filter water before it reaches streams. ▶ Prevent oil spills through local and regional planning and implementation efforts.
Predation	▶ Reduce or eliminate man-made predator buffets.
Boat Traffic	▶ Restrict vessel speed and/or redirect vessel routes - Many inlets and passages in South Puget Sound offer narrow and shallow openings for marine traffic. The wake from passing boats and ships passing through these constrictions can cause shoreline erosion and damage to the near-shore marine environment. Much of this impact can be avoided by selectively controlling speeds and vessel routes located near sensitive areas. ▶ Require specific anchoring practices and docking design.
Invasive Species	▶ Require that ballast water in commercial ships be exchanged or treated before release in South Puget Sound - Before a voyage commercial ships must take in water (ballast) for stability. Once a ship arrives at its destination port this water is released. A common method of non-native species introduction is by being carried in this ballast water. By requiring the dumping or treatment of ship ballast water exotic species would be prevented from introduction. ▶ Remove from riparian areas invasive terrestrial non-native vegetation, such as scotch broom.
Shellfish Aquaculture	▶ Identify Shellfish Aquaculture Impacts and Improve Management Practices - The production and harvest of shellfish involves a variety of techniques that can negatively affect the nearshore environment. Practices should continue to be developed to avoid and mitigate potential negative impacts. One document that sets a solid framework for this work is the Pacific Coast Shellfish Growers Association's Environmental Codes of Practice for the Pacific Coast Shellfish Industry, adopted in 2002 to minimize an array of impacts associated with the most common industry practices.

Assessment Overview of Nearshore

Landscape Region	Intact Areas	Stressors											
		Shoreline Armoring	Overwater Structures	Ramps	Stormwater/ Wastewater	Landfill Below HHWL	Riparian Loss	Wetland & Estuarine Mod.	Input of Toxic Components	Predation	Boat Traffic	Invasive Species	Shellfish Aquaculture
Case Inlet													
Eastern Power Line Crossing to Western Power Line Crossing	●				●	●							
Western Power Line Crossing to Fair Harbor	●	●					●	●					
Fair Harbor to Southern Tip of Stretch Island, inc. Reach Island		●	●		●		●						
Eld Inlet													
North side of unnamed Cove to north side of Youngs Cove	●	●			●		●	●					●
Youngs Cove to Flapjack Point		●			●		●	●					●
Flapjack Point to Frye Cove	●	●			●		●	●					●
Frye Cove to Sanderson Harbor	●	●			●		●	●					●
Hammersley Inlet & Oakland Bay													
Hungerford Point to Libby Point	●						●						
Libby Point to Munson Point	●	●					●						
Munson Point to Bayshore	●				●			●					●
Bayshore to Eagle Point		●	●		●		●	●					
Eagle Point to Skookum Point	●	●					●	●					
Skookum Point to Arcadia	●	●			●								

Landscape Region	Intact Areas	Stressors											
		Shoreline Armoring	Overwater Structures	Ramps	Stormwater/ Wastewater	Landfill Below HHWL	Riparian Loss	Wetland & Estuarine Mod.	Input of Toxic Components	Predation	Boat Traffic	Invasive Species	Shellfish Aquaculture
Hartstene Island Group													
Devils Head to North Entrance of Taylor Bay	●	●											
North Entrance of Taylor Bay to North Entrance of Whiteman Cove		●						●					
North Entrance of Whiteman Cove to Herron, Including Herron Island	●	●						●					
Herron to North Spit of Dutcher Cove	●	●					●						
Stretch Island Bridge to Walkers Landing	●	●				●	●						
Walkers Landing to Hungerford Point	●	●				●	●						
Steamboat Island to Hunter Point		●					●						
Hunter Point to Sanderson Harbor		●			●		●	●					●
Dofflemyer Point to East Entrance of Little Fishtrap	●	●	●				●						
East Entrance of Little Fishtrap to Henderson Inlet	●	●											
Johnson Point to Baird Cove		●	●		●		●						
Baird Cove to Mill Bight	●	●	●		●		●						
Mill Bight to Dog Fish Bight		●					●						
Dog Fish Bight to Sandy Point		●				●		●					
Sandy Point to Butterball Cove	●	●			●			●					
Butterball Cove to DeWolf Bight	●	●											
DeWolf Bight to Hogum Bay	●	●					●						
Hogum Bay to Mc Neill Island Group (122 degrees 45') (Meridian Road)	●	●											●

Landscape Region	Intact Areas	Stressors											
		Shoreline Armoring	Overwater Structures	Ramps	Stormwater/ Wastewater	Landfill Below HHWL	Riparian Loss	Wetland & Estuarine Mod.	Input of Toxic Components	Predation	Boat Traffic	Invasive Species	Shellfish Aquaculture
Hartstene Island- Dougall Point to Fudge Point, Including McMicken Island	●	●					●						
Hartstene Island- McMicken Island to Brisco Point	●	●					●						
Hartstene Island - Brisco Point to Salmon Point–		●					●	●					●
Hartstene Island- Salmon Point to Northwest Point of Hartstene Island	●	●					●						●
Northwest Point of Hartstene Island to Dougall Point	●	●					●						
Squaxin and Hope Islands	●		●										
Totten and Skookum Inlet													
Arcadia to Windy Point		●					●						●
Windy Point to Barron Point (mouth of Skookum Inlet)	●						●						●
Little Skookum Inlet	●							●					●
Wildcat Harbor to Hurley Cove		●					●						●
Hurley Cove to County Line	●												●
County Line to West Side of Burns Cove	●							●					●
West Side of Burns Cove to Hudson Cove		●					●						●
Hudson Cove to East Entrance of Gallagher Cove		●					●						●
East Entrance of Gallagher Cove to Steamboat Island		●					●						●

- Appendix B -

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